

# REPORT

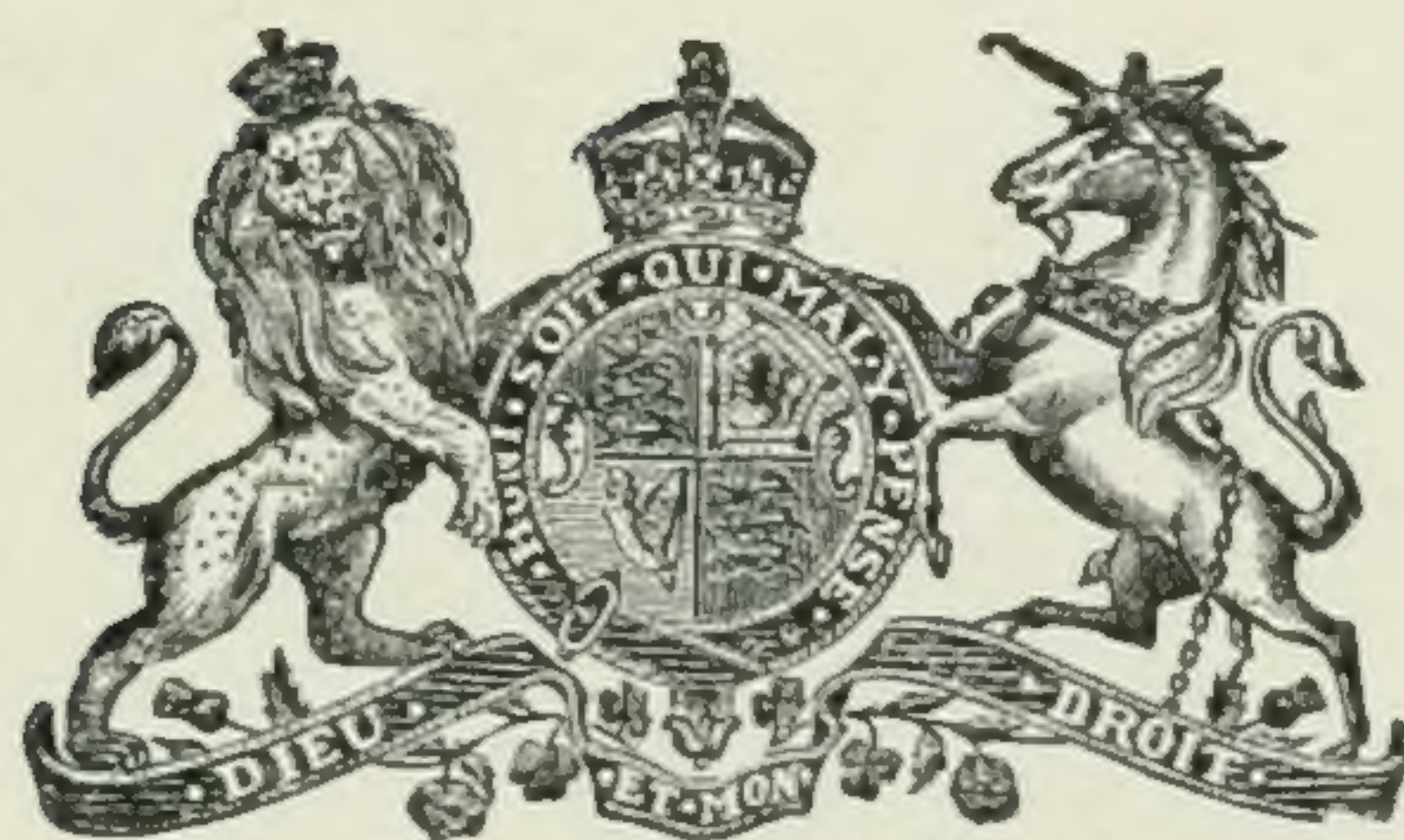
OF THE

# DEPARTMENT OF THE NAVAL SERVICE

FOR THE

FISCAL YEAR ENDING MARCH 31, 1915

*PRINTED BY ORDER OF PARLIAMENT.*



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EXCELLENT MAJESTY

1915

[No. 38—1916]







*To Field Marshal, His Royal Highness Prince Arthur William Patrick Albert,  
Duke of Connaught and of Strathearn, K.G., K.T., K.P., etc., etc., etc.,  
Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR ROYAL HIGHNESS:

I have the honour to submit herewith for the information of Your Royal Highness and the Parliament of Canada, the fifth Annual Report of the Department of the Naval Service, being for the year ended March 31, 1915, except the Fisheries Branch, reported in a separate publication.

I have the honour to be,

Your Royal Highness's most obedient servant,

J. D. HAZEN,

*Minister of the Naval Service.*







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**REPORT**  
OF THE  
**DEPARTMENT OF THE NAVAL SERVICE**  
FOR THE  
**FISCAL YEAR ENDING MARCH 31, 1915**

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OTTAWA, September 1, 1915.

Hon. J. D. HAZEN,  
Minister of the Naval Service,  
Ottawa.

SIR,—I have the honour to report on the Department of the Naval Service for the year ending March 31, 1915, under the following headings:—

1. Naval Service.
2. Fisheries Protection.
3. Survey of Tides and Currents.
4. Hydrographic Surveys.
5. Canadian Arctic Expedition.
6. Life Saving Service.
7. Radiotelegraphs.

1.—NAVAL SERVICE.

The cadets in the college and the midshipmen at sea, in both Canadian and Imperial ships, continue to be well reported upon and to give satisfaction to their superior officers.

Eight cadets were entered after the usual annual examination, in May 1914.

The four sub-Lieutenants have all been promoted to Lieutenants during the course of the fiscal year, and are serving in ships in the Royal Navy; as are the Engineer-Lieutenants with the exception of one who is in the Royal Canadian Naval College at Halifax. The activities and organization of the Naval Service have, owing to the outbreak of war, been much increased and expanded. The preparations previously made have been carried out and enlarged to meet the contingencies which have arisen.

The "*Niobe*" and "*Rainbow*" were placed in full commission, and placed at the disposal of the Admiralty, as were also the two submarines purchased, shortly before the outbreak of war, the sloop "*Shearwater*" being used as a parent ship for the latter by the permission of the Admiralty. A considerable



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number of other vessels have also been commissioned and used for various subsidiary purposes. The dockyards at Esquimalt and Halifax have been used for work in connection with the repair and upkeep both of Canadian and imperial ships, and in obtaining and issuing supplies of stores of all descriptions to imperial vessels as well as meeting our own needs in this respect. The arrangements for the transport of stores and supplies to England have also been handled by this department to a large extent.

The department has acted as recruiting agent for the Admiralty and has been in close co-operation with the imperial naval authorities in all matters coming within its sphere of activities in relation to the state of hostilities.

The R.N.C.V.R. chiefly recruited at Esquimalt have been actively and usefully employed both ashore and afloat and have shewn, both officers and men, commendable zeal in the performance of their duties.

A Naval Intelligence Branch was established on the outbreak of war, which works in co-operation with the Admiralty.

Regulations have been passed providing special rates of pay for men enlisted for the period of the war and for the payment of separation allowance to the dependents of those serving in the Royal Canadian Navy.

### NAVAL DOCKYARDS.

The work at the naval dockyards at Halifax and Esquimalt has increased materially during the year.

The nature of the work done is purely repairs, the only new work being boats of a small type.

In view however of the increased requirements of a naval character, since the outbreak of hostilities it has become absolutely necessary, in order to cope with the repair of vessels of the fleet, to consider certain additions to the workshop accommodation, additions to the shop machinery and also increased berthing accommodation and storage facilities.

With this object, plans and specifications were prepared for increasing the berthing accommodation at No. 4 wharf at Halifax. Tenders were called for and the necessary work is now in progress. An additional workshop is being erected for dealing with torpedo work and providing increased facilities for repair to boilers. An additional store has also been erected to accommodate the necessary victualling stores for the vessels in commission. Tenders have also been obtained for a 30-ton steam wharf crane for No. 4 wharf with a view of having available suitable lifting appliance for hoisting out damaged parts of warships, should the necessity arise.

At Esquimalt yard it has been found necessary to fit out an additional workshop to provide facilities for repairs to the machinery of the submarine boats, this being largely of a special nature. Other additions to the workshop machinery have also been made and a set of sheerlegs has been erected at the Dockyard wharf. Berthing accommodation at this yard is very limited, and negotiations are in progress with the Department of Militia and Defence with a view of utilizing the existing submarine mining station as a submarine depot.

Halifax is being used at the present time as the principal base for vessels of the North Atlantic fleet and the naval yard is being utilized to carry out the repairs of these vessels, which include "*Niobe*," this vessel being employed as one of the patrol vessels of this squadron.

Esquimalt dockyard is being similarly utilized on the Pacific coast, and the dockyard has carried out repairs to various vessels in the imperial fleet employed in these waters including *Rainbow*, *Newcastle* and also work on H.I.J.M.S. *Idzuma*.



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In addition to the repairs to the vessels of the fighting fleet, the dockyards are carrying out the large number of small items of repairs needed to the various vessels now employed for auxiliary purposes for patrol and other defensive work of the Coasts.

Having regard to the facilities available, this work has been carried out satisfactorily. Considerable overtime has been necessary in order to expedite the completion of the repairs.

Subsidiary work in the nature of repairs and refits of the various vessels belonging to the different branches of the Naval Service have been undertaken during the year, and repairs of vessels of other departments of the Government have also been effected. Repairs to buildings and plant incidental to the upkeep of the establishment in accordance with conditions of transfer have also been completed.

The officers and staff of the dockyards have carried out their duties in a zealous and conscientious manner, which has enabled the urgent work necessary in these yards during the period of the war to be satisfactorily and expeditiously completed.

The undermentioned vessels have been under repair during the year:

## HALIFAX.

*General repairs.*—H.M. Ships *Glory*, *Suffolk*, *Coronia*, *Princess Royal*, *Essex*, *Leviathan*. H.M.C. Ships *Niobe*, *Canada*, *Tuna* and *Margaret*.

*Refits and repairs.*—To C.G. Ships *Acadia*, *Constance*, *Petrel*, *Curlew*, *Speedy* and *Alfreeda*.

*Minor repairs under repayment.*—To *Premier*, *Sable I* and other trawlers, also the steamboats and motor-boats attached to port for service.

## ESQUIMALT.

*General repairs.*—To H.M. ship *Newcastle*, also to H.M.C. ships *Rainbow*, *C.C.-1*, *C.C.-2*, *Shearwater* and Japanese Cruiser *Idzuma*.

*Refits and repairs.*—To C.G. ships *Malaspina*, *Galiano*, *Lillooett*, *Newington* and *Falcon*.

*Minor repairs.*—To other vessels attached to the port for naval service.

The report of the Director of the Naval Service on the Naval Branch is appended at page 61.

## 2.—FISHERIES PROTECTION.

The following vessels were employed in the districts named on Fisheries Protection Service from the time of commissioning until the outbreak of war, when those operating on the east and west coasts were ordered to Halifax and Esquimalt, respectively, for war service.

## EAST COAST.

*Canada*, *Curlew*, *Constance*, *Petrel*, *Gulnare*.

## GREAT LAKES.

*Vigilant*.

## WEST COAST.

*Malaspina*, *Restless*, *Newington*, *Galiano*.



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The fisheries protection vessels on the east coast are employed in patrolling the regions wherein the United States and French fishing fleets operate. As the law prohibits these fishing vessels from fishing within the three-mile limit, the greatest vigilance is required from the fisheries protection vessels. The vessels encountered very little illegal fishing. The fishing season was reported to be below the average.

The *Vigilant* was commissioned on April 17th to enforce the international regulations in Lake Erie. While on her official duties she was also used for the inspection of life saving stations, when convenient. 576 nets belonging to United States fishermen and used contrary to the law were seized during the season.

On the west coast, the fisheries protection vessels carried on patrol work until the outbreak of war, when they were sent to Esquimalt for war service. Several seizures of vessels for infractions of the law were made.

C.G.S. *Malaspina*, a new fisheries protection cruiser was put in commission late in 1914. C.G.S. *Galiano* a new fisheries protection cruiser of 700 tons, built by the Dublin Dockyard Company in Ireland, was added to the service during the season of 1915.

The fisheries protection vessels on several occasions rendered assistance to other ships.

The report of Vice-Admiral C. E. Kingsmill on the fisheries protection service is appended at page 63.

### 3.—SURVEY OF TIDES AND CURRENTS.

The survey of tides and currents of waters of the Dominion of Canada was begun in 1886. The object of the work undertaken is to assist in the navigation of waters where the irregularity of tides and currents renders navigation difficult. The work of this branch of the service consists in the prediction of tides and the scientific investigation of the currents of navigable waters. Tide stations are located at convenient places, where observations are taken. From these observations are predicted the variations of the tides for future years. The work of predicting tides is carried out scientifically by the Tidal and Current Survey staff, the stations being used to obtain the information necessary for the work. When sufficient observations have been taken at a particular station to enable the tides of the future to be accurately calculated without its further use the station is said to be established. By connecting up established stations along the coasts and rivers, the officers of this branch have succeeded in predicting the tides of a considerable portion of the navigable waters of Canada. The result of this work, published in the "Tide Tables," is of great value to mariners, as it enables them to know the exact time of high and low water in those regions where the rise and fall of the tide materially affect navigation.

This branch of the service has also investigated the principal currents of Canadian waters. The information obtained from these investigations enables mariners to contend with the difficulties resulting from currents, particularly in the British Columbia narrows, where they are most pronounced.

The work of the branch has been carried on throughout the past year in an efficient manner, several new tide stations having been established. On account of the importance of accurate information in connection with the tides of the Bay of Fundy, the tide station of St. John, N.B., which has been in operation since 1894, has been rebuilt.

Revised methods for the calculation of slack water have been devised and applied to actual operations in the British Columbia narrows. By means of the information supplied mariners are now able to know exactly the time when these narrows are navigable.



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Much valuable information has been obtained from co-operation with other surveys. The department supplies instruments by which the members of such surveys are enabled to take observations, and obtain data which are utilized by this branch.

Observations in connection with the passes of British Columbia, particularly Sansum narrows, Dodd narrows and Porlier pass, have been carried on with most satisfactory results. The reduction of observations of the Gordon expeditions of 1884-5-6 in Hudson bay and strait have also been completed. Regular work has also been carried out in the St. Lawrence river and Gulf and in the Bay of Fundy.

Requests for information in connection with tide levels are yearly increasing. This information is found to be most useful to other departments in connection with their leveling operations.

Tidal observations and predictions are published in two sets, one for the eastern coast and one for the Pacific coast. The tide tables for the eastern coast are published in two editions, one for Quebec and the St. Lawrence and one for St. John and the Bay of Fundy.

A pocket edition of the Tide Tables is also published.

That the information therein contained is very useful to mariners and to the fishermen along the coast, is evident from the fact that 10,000 copies of the Pacific coast edition and 15,000 copies of the Eastern edition are required to supply the demand.

The report of Dr. W. Bell Dawson, Superintendent of Tidal and Current Surveys, is appended at page 69.

#### 4.—HYDROGRAPHIC SURVEYS.

The work of this branch in charge of Mr. W. J. Stewart, C.E., Chief Hydrographer, was carried on successfully throughout the year, under the following divisions, viz.: 1, Hudson bay party; 2, Pacific coast party; 3, Lower St. Lawrence river party; 4, Lake Ontario party; 5, Lake Superior party; 6, James bay party; 7, automatic gauges. The branch was considerably handicapped in the latter part of 1914 through the enlistment for overseas service of some of the most useful members of the different parties and also on account of some of the survey ships being required for examination service in connection with the war.

The Hudson bay party in charge of Captain F. Anderson on board C.G.S. *Acadia* left Halifax on the 11th of July. The party experienced great difficulty in making a landing to carry on the work on account of the heavy ice encountered. They began operations in Hudson strait on the 12th August. Survey work was carried on around the islands in Hudson strait until the 10th September. The party then proceeded to Port Nelson. Survey work was carried on along the south shore of Hudson bay as far east as Cape Henrietta Maria.

On the return voyage from Port Nelson, survey work on the south shore of Mansel island in Hudson strait and also soundings and coast line work were carried out. As a result of the season's work the chart of Hudson bay will be rendered more accurate and plans of Charles inlet harbour, Savage harbour and Acadia cove harbour, will be published. 400 miles were traversed and 300 miles were checked up, 900 miles were sounded and observations for latitude, longitude and azimuth were taken at ten different points during the season.

The Pacific coast party in charge of Lt.-Commander P. C. Musgrave in C.G.S. *Lillooet* and the schooner *Naden* carried on survey work at Dall Patch, Seaforth channel, Skeena river east of De Horsey island and as far as Tyee; and also the North Skeena river passage, Laredo channel and Surf inlet, Naas river, Granby bay, Dixon entrance and Queen Charlotte islands. During the



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season 81 miles of coast line were traversed and 205 square miles of soundings were taken. Lt. J. H. Knight and Mr. Turner, of this survey, enlisted for active service and their absence was keenly felt in carrying out the work.

The following charts were completed:—Skeena river (Telegraph passage to Raspberry island), Skeena river (North Skeena passage, Dominion cannery to Clara point), Laredo channel (northern portion and approaches to Surf inlet), Port Lewis and approaches, Fisherman cove, Ursula channel, Dixon entrance (soundings), Hecate strait (soundings), Bar of Nass river (soundings).

The Lake Ontario party in charge of Mr. G. A. Bachand in C.G.S. *Bayfield*, carried on survey work between Toronto and Niagara river throughout the season. The survey of this portion of Lake Ontario will be completed early in the season of 1915. During the season 48 miles of traversing, 830 miles of soundings from boats and 1,000 miles of soundings from the ship, extending over an area of 530 square miles, were completed. The weather conditions were more favourable for the work than for the past season.

The Lower St. Lawrence party, in charge of Mr. Charles Savary in C.G.S. *Cartier*, carried on survey work between Sanday bay on the south shore and Point à Paradis on the north shore until the outbreak of war, when C.G.S. *Cartier* was utilized for examination service at Quebec. In October the vessel was again placed at the disposal of the party to enable them to obtain the necessary triangulation to permit them to carry on the winter's work.

A new chart of the south shore as far east as Matane and the north shore as far east as Pointe des Monts will be published shortly.

The Lake Superior party, in charge of Mr. H. D. Parizeau in C.G.S. *La Canadienne*, carried out survey work between Pic island and Otter head. A plan of Peninsula harbour and Port Munro has also been completed and submitted to the engraver. This plan will be published shortly. A re-survey of Little Current was also carried out. Weather conditions, however, rendered the season's work difficult and limited to a great extent the season's operations.

During the season 135 miles of shore line were traversed and 500 miles of soundings from boats and 125 miles from the ship were taken.

The James bay party, in charge of Mr. Paul Jobin, proceeded to the field of their operations by way of Cochrane. An examination of the shore in the vicinity of Mount Sherrick was carried out, and an excellent location for a harbour was found. Charlton and Strutton islands and Strutton harbour were also surveyed.

The triangulation of the previous season was carried as far as the east end of Trodeley island and the exact position of Lisbon shoal was determined. A survey was successfully carried out for the waters extending from Moose river to North Bluff beacon. Hazy weather hindered the party during a considerable part of the season.

The automatic gauges party, in charge of Mr. C. A. Price, carried out the season's operations in a very successful manner. A list of the automatic gauges in operation is contained in the report of Mr. W. J. Stewart, C.E., Chief Hydrographer. A complete list of new charts issued during the year is given in the same report. The report of Mr. W. J. Stewart, C.E., Chief Hydrographer, is appended at page 78.

## 5.—CANADIAN ARCTIC EXPEDITION.

In February, 1913, Mr. Vilhjalmur Stefansson, a prominent Arctic explorer, approached the Canadian Government to obtain assistance in conducting an expedition to the arctic regions for the purpose of exploration and to obtain scientific information. The Government agreed to finance the expedition and it was organized under the leadership of Mr. Stefansson. The Departments of the Naval Service, Geological Survey, Marine and Fisheries, Interior and



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Customs, all being interested in the results to be obtained, co-operated in fitting out and providing the personnel of the expedition. Its general direction was entrusted to the Department of the Naval Service.

The *Karluk*, a wooden auxiliary brigantine, was purchased and placed under command of Captain R. A. Bartlett for the use of the members of the expedition. As, however, the accommodation available in this ship was insufficient for the party and for the extensive supplies and personal effects required, it was found necessary to purchase two additional ships for the expedition. The *Alaska* and *Mary Sachs* being the most suitable vessels offered, were accordingly purchased.

The work to be undertaken was so varied both in the nature of the investigations and the territory to be explored, that it was decided to divide the expedition into two parties. The northern party, in C.G.S. *Karluk* were to proceed to Herschel island and there leave any members and supplies of the southern party thus far transported in the vessel. They were then to proceed north to explore the Beaufort sea and establish themselves in winter quarters in the vicinity of Banks Land or Prince Patrick island. The *Karluk* was then to proceed south for the winter. If it were found impossible to send the ship south before winter, it was to be sent the following spring. The *Karluk* was to return for the party in the summer of 1915.

The work of the northern party was to extend through a period of three years. The party were to explore the Beaufort sea and they were also to carry on investigations into the animal life of this region and take soundings in the districts investigated. They were also to ascertain if lands hitherto unknown exist and to definitely mark any found.

Following is the personnel of the party which sailed in C.G.S. *Karluk* from Nome, Alaska, on the 20th July, 1913.

## MEMBERS OF THE NORTHERN PARTY.

Vilhjalmur Stefansson, in command. (Mr. Stefansson was born in Canada in 1879. He led two former expeditions to the arctic regions; the first under the auspices of Toronto and Harvard Universities; the second, under the auspices of the Geological Survey and The American Museum of Natural Science.) James Murray, oceanographer; George Malloch, geologist; B. M. McConnell, meteorologist; Dr. Forbes Mackay, surgeon; Bjarne Mamen, assistant to G. Malloch; Captain R. A. Bartlett, in command of vessel.

## MEMBERS OF THE SOUTHERN PARTY.

D. Jenness, anthropologist; B. M. Wilkins, photographer; H. Beauchat, anthropologist; V. McKinley, magnetician.

REPORT ON OPERATIONS OF THE PARTY IN C.G.S. *Karluk* AND LOSS OF THAT SHIP.

The party in C.G.S. *Karluk* sailed from Nome, Alaska, on the 20th July, 1913. Good progress was made until the 2nd August when the ship was caught in the ice 30 miles S.W. of Barrow and 6 miles from the shore. On the 7th August clear water was gained. The party proceeded on their route to Herschel island until the 12th August, when the *Karluk* was caught hard in the ice from which it was not afterwards able to clear. The party drifted about with the ice for several weeks without making any progress.

On the 20th September, as the floe on which the party were carried had not moved for several weeks, it was decided that the ship was frozen in for the winter.



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To increase the supply of fresh meat, V. Stefansson accompanied by B. M. McConnell, B. M. Wilkins and D. Jenness undertook a hunting trip to the mainland which was visible in the distance. On their way they were overtaken by a northeast gale which forced them to seek shelter on Thetis island. This gale drove the ice floe in which the *Karluk* party were frozen far to the westward leaving the ocean in the vicinity of Thetis island free from ice. The hunting party were unable to gain the mainland for some days on this account.

As no trace of the *Karluk* could be seen, the party decided to travel west along the coast. They set out on the 5th October. From information obtained from Eskimos along the route the party learned that the southern division of the expedition were wintering at Collinson point. With assistance received from the natives, whom V. Stefansson knew from previous expeditions, they were able to push forward to Point Barrow, Alaska, from which place Mr. Stefansson sent a full report of his movements to the Department of the Naval Service. On the 8th November the party left Barrow, Mr. Jenness remaining to carry on scientific research at Harris bay. They arrived at Collinson point on the 14th December, where they joined the southern party.

### C.G.S. *KARLUK*.

For nearly four months after the party headed by V. Stefansson left the *Karluk*, the vessel and party were carried about in the floe. During the whole period of drifting the prevalent winds were northeasterly, which accounts for the westward motion of the ice in which they were caught. On the 21st August the party were about twenty miles north of Flaxman island (Lat. N.  $70^{\circ} 28'$ , approx. long. W.  $145^{\circ} 30'$ ). From that date until the 5th October they drifted in a westerly direction as far as Point Barrow. From this point they drifted in a northerly direction until the 22nd October, the most northerly point reached being N. Lat.  $72^{\circ} 30'$ . Throughout November the south east gales caused the drift to be for the most part westerly. The weather in November and December was very cold. The prevailing winds caused heavy falls of snow which made travelling over the ice exceedingly difficult and dangerous. The same conditions existed up to the time the *Karluk* was crushed by the ice.

Throughout the entire drift the party were busy dredging and taking soundings. The dredging operations led to many interesting and instructive discoveries. Specimens hitherto unknown were discovered and much information concerning the animal life of the region was brought to light. It is to be regretted that, as all the data and specimens obtained were lost with the sinking of the *Karluk* the results of the scientific research of this division of the expedition cannot be published. Under the circumstances, however, this is unavoidable.

Life on board during the period of drift was uneventful. The time and attention of the men were taken up in building sledges, making fur clothing and preparing iglows on the floe to accommodate the party in the event of the ship having to be abandoned. An abundance of fresh meat was obtained, many seals and a polar bear having been shot.

On the 11th January, 1914, the ship was crushed by the ice. The party, however, were fully prepared to take up their quarters in the iglows which they had previously built. The ice pierced the ship in the boiler room, putting the pumps out of commission. The *Karluk* sank in 38 fathoms of water (N. Lat.  $72^{\circ} 8'$ , W. Long.  $173^{\circ} 50'$ ). This position is a short distance from Herald island.

All supplies necessary for the maintenance of the party had previously been transferred to the ice. In this locality during the winter months the sun does not appear above the horizon and almost total darkness prevails. The proper course, therefore, for the shipwrecked party was to remain in the quarters prepared on the ice until the return of the light. Some of the members however,



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chafed under the inaction and expressed a strong desire to proceed to land. Accordingly, on the 21st January, an advance party, composed of Alex. Anderson, Charles Barker, John Brady, and A. King, set out from camp to effect a landing on Wrangel island. On the 3rd February, B. Mamen and two Eskimos, who had acted as supporting party, returned to camp. They stated that the party had arrived to within three miles of the land but were then stopped by open water. It was also discovered that the land supposed to be Wrangel island was in reality Herald island.

On the 5th February Dr. F. Mackay, James Murray, H. Beauchat and T. S. Morris left camp for land with fifty days' provisions. It was agreed that this party were to take full responsibility for their own safety and an agreement was signed by them to that effect.

Early in February E. F. Chafe, with two Eskimos, was sent with supplies which he was instructed to land on Herald island. He was then to return to camp. Chafe and the natives returned to camp on the 16th February having been unable to land on the island owing to open water a short distance from the shore. He reported that he was unable to see any signs of life on the island, although he examined the shores carefully with powerful field glasses and spent two days in the vicinity endeavouring to effect a landing. He also reported that he had met the Mackay party about 20 miles from the island on his return trip. Beauchat's hands were frozen and the party were in poor condition for arctic travel, but they refused all offers of assistance and transportation back to camp. Nothing has since been heard of these parties.

The light having improved, the remaining members decided on the 19th February to attempt an advance to land and a party composed of G. Malloch, John Hadley, Robert Williamson, George Breddy, E. F. Chafe, John Munro, F. W. Maurer, and H. Williams set out for Wrangel island over the same trail which had previously led to Herald Island. On the 24th February Captain R. A. Bartlett with the remaining members of the division followed this advance party. On the 12th March the whole party landed on Wrangel island, where camping facilities were easily obtained. All supplies were transferred to the Island.

On the 18th March Captain Bartlett, accompanied by an Eskimo, started for the Siberian coast, a distance of 160 miles, to obtain assistance for the party on Wrangel island. He carefully followed the shore of the island and kept a close lookout in the hope of locating the missing men, but no evidence of their presence could be found.

On his journey over the ice Captain Bartlett encountered strong gales, heavy rafters of ice and snow, with countless leads of open water, which necessitated much roundabout travel. The journey to land took 17 days. He arrived in Siberia about 50 miles west of North Cape on the 4th April. On his journey from this point to East Cape he passed through several Eskimo villages, the inhabitants of which treated him most kindly. At East Cape he met Baron Kleist, the Russian Government representative in charge of Eastern Siberia. Baron Kleist was most considerate to Captain Bartlett and invited him to his home at Emma harbour, at which place they arrived on the 16th May.

From Emma harbour, Captain Bartlett sent out word to the various native settlements, asking them to notify the captain of any whaling or trading vessel which they might see of his whereabouts.

On the 21st May, Captain Peterson of the steam whaler *Herman* called upon him. When Captain Peterson heard that the *Karluk* party were stranded on Wrangel island he left his whaling and trading business and proceeded with Captain Bartlett toward Nome, Alaska. Unable to land there on account of ice conditions, they made St. Michaels, Alaska, from which point Captain



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Bartlett communicated to the department the loss of the *Karluk* and the whereabouts of the survivors.

The department took immediate action for the relief of the party on Wrangel island. The services of four vessels were obtained for relief work. The United States revenue cutter *Bear*, through the courtesy of the United States government, was sent to endeavour to reach Wrangel island. The Russian government sent the *Taimyr* in charge of Commander Vilkitski, to the rescue of the shipwrecked party. The *King and Wing*, a trading vessel, and the *Corwin*, the property of Messrs. H. Liebes & Co. of San Francisco, the latter through the generosity of Jafet Lendeborg of Nome, Alaska, were sent for the same purpose.

On the 7th September, 1914, the *King and Wing* succeeded in rescuing the party from Wrangel island. They were later transferred to the *Bear* and landed in Victoria, B.C. Medical attendance was provided by the government for those of the party who had suffered from the hardships endured during their sojourn on Wrangel island.

The survivors were:—John Munro, R. Williamson, W. McKinley, F. E. Maurer, John Hadley, R. Templeman, H. Williams, and E. F. Chafe. B. Mamen and G. Malloch died from nephritis and George Breddy was accidentally shot while on Wrangel island.

From circumstantial evidence obtained the department has concluded that the first two parties to leave shipwreck camp have perished and has given up all hope of their recovery. That the first party did not land on Herald island is apparent. B. Mamen, who accompanied the party to within three miles of the Island, reported that the party were unable to land on account of open water. The party on Wrangel island also made two trips across the ice to the vicinity of Herald island without finding any trace of the missing men. This party also searched Wrangel island and ascertained that they were not located there. The Russian vessel *Taimyr*, on its way to Wrangel island, passed close to Herald island and, although a close watch was kept for members of the party, no evidences of their presence there were seen. Reports of the condition of Herald island indicate that it is uninhabitable. The shores are very steep, as a result of which no drift wood (indispensable for lengthy sojourns on northern islands) is to be obtained. The conditions of the shores render landing on the island extremely difficult. In view of this evidence it is to be regretted that all hope of their recovery must be abandoned. The diary of Captain R. A. Bartlett and a chart shewing the drift of the *Karluk*, are appended hereto.

#### REPORT OF OPERATIONS OF SOUTHERN DIVISION.

The following members of the southern division of the expedition sailed from Nome in the *Alaska* and *Mary Sachs*. Dr. R. M. Anderson in command:—J. J. O'Neill, geologist; Kenneth G. Chipman, topographer; J. R. Cox, topographer; F. Johansen, biologist. The *Alaska* and *Mary Sachs* sailed from Nome on the 19th July and 20th July respectively. The *Mary Sachs* party arrived off Collinson point on the 27th July. Owing to ice conditions they were unable to proceed further. The party in the *Alaska* had proceeded as far as Flaxman island on the 6th September, but were forced to return on account of heavy ice which hindered further progress. They returned to Collinson point, where in company with the members from the *Mary Sachs* they went into winter quarters. The work of the southern division was to comprise the investigation and areal mapping of the copper-bearing and associated rocks of the mainland between Cape Parry and Kent peninsula, and, for approximately 100 miles inland and on the southern and eastern shores of Victoria island.

The party immediately began winter operations. K. G. Chipman and J. R. Cox, topographers, took a large number of astronomical observations, solar



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and stellar, including a series of lunar occultations at Collinson point. J. J. O'Neill proceeded from Collinson point in February, 1914, to carry on his geological work by a reconnaissance of Herschel Island river, in which work he was very successful. K. G. Chipman and J. R. Cox left Collinson point on the 16th March and proceeded to Demarkation point. From that place they ran a survey line to Herschel island, thus succeeding in tying in Herschel with the surveys of the international boundary party of 1912, who, on account of weather conditions, had failed to do so. Mr. Cox then made a trip up Herschel Island river and located the necessary positions for the completion of Mr. O'Neill's geological work. Mr. Chipman and Mr. O'Neill proceeded to the west branch of the Mackenzie delta, where they carried on survey work until June. They then proceeded to Herschel island to join the party on board the *Alaska*. From Herschel island Mr. Cox proceeded to survey the coast as far east as Escape reef. He then surveyed the west channel of the Mackenzie delta. The above work was carried out in a most efficient manner and very valuable information has been obtained.

Mr. Johansen spent the winter at Demarkation point at which place he took tidal observations, at the same time paying attention to his other lines of botany and entomology.

D. Jenness, entomologist of the party, who had come ashore with V. Stefansson from the *Karluk*, spent the winter working among the Eskimos at Harris bay, Cape Halkett and Point Barrow. He later returned to Collinson point to carry on archæological work there. He carried on similar work on Barker island until he was taken on board the *Alaska* for the summer operations.

V. Stefansson, upon his arrival at Collinson Point from the *Karluk*, purchased the *North Star* to replace that ship. (Although the fate of the *Karluk* was at that time unknown, Mr. Stefansson realized that the members of the expedition could not count on having it at their disposal.) He also planned a trip over the ice, to the north, which was to take about three weeks. The supplies on the *North Star* were ample to supply him with provisions. He left full instructions as to the course to be pursued in the event of his not returning at the time specified.

V. Stefansson left Martin point for his trip over the ice on the 22nd March, accompanied by six men. The advance party was composed of V. Stefansson, in command, Storker T. Storkerson and Aurnout Castel. The supporting party, to return after ten days' travel, were James R. Crawford, Fritz Johansen, Geo. H. Wilkins, and B. M. McConnell. For the first two days no serious obstacles to the progress of the party were encountered. The ice over which the party were proceeding then began to drift and they were carried far to the eastward. The two parties separated on the 7th April, 1914. The supporting party returned to Collinson point on April 23rd and gave a full report of the movements of Mr. Stefansson and his companions. No report has since been received of the ice party.

On the 11th August B. M. Wilkins, in charge of the party in the *Mary Sachs*, sailed from Herschel island for Banks land. This party purposed to erect beacons and to leave caches of provisions well marked in prominent places along the coast of Banks land likely to be seen by the Stefansson party if they should be in the vicinity. They expected to winter in Banks land whence they were to carry on expeditions in search of the ice party. This party, under the zealous leadership of Mr. Wilkins, will neglect no opportunity to bring assistance to Mr. Stefansson and his companions. Upon their location, the vessel is to be used as a base for the Northern division.

On the 17th August, 1914, Dr. R. M. Anderson, in charge of the party in C.G.S. *Alaska*, sailed from Herschel island for Dauphin and Union Straits. The *North Star*, Mr. Cox in command, sailed for the same locality on the 18th



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August. Both vessels proceeded as far as Chantry island where they arrived on the 24th August. The parties entered a small landlocked harbour, not indicated on the charts, which is situated about fifteen miles east of Cockburn point. As the protection afforded is favourable for wintering and also for carrying on the operations of the expedition, they decided to establish themselves in winter quarters there.

R. M. Anderson, leaving the scientific party with the *North Star* at the new winter base, returned in the *Alaska* to Herschel island for supplies and fuel. He arrived at Herschel island on the 11th September. On the 13th September he started on his return voyage. He proceeded as far as Bailey island where his ship was caught in the ice and frozen in. Leaving Captain Sweeney, Engineer Blue and an Eskimo to take care of the ship, Dr. Anderson set out across the ice to join the party wintering at Chantry island.

As the southern division have safely arrived on the ground of the season's operations, the results of operations should be particularly successful. The southern party are located in the centre of the area they were to investigate, and the department expects the next report, which should be received in the fall of 1915, to be most satisfactory.

The health of the expedition, as reported by Dr. Anderson on his last trip to Herschel island, 11th September, 1914, is very good.

The weather conditions throughout the summer of 1914 were exceptionally mild as a result of which very little ice was encountered during the summer months.

## 6.—LIFE SAVING SERVICE.

The life saving service of Canada was transferred from the Department of Marine to the Department of the Naval Service on 1st May, 1914.

The object of this service is to render assistance to ships in distress and to rescue lives from wrecked vessels on the Canadian coast.

There are in operation in Canada 42 life-saving stations of which 27 are situated on the Atlantic coast, 11 on the great lakes and 4 on the Pacific coast.

The different life saving stations have been efficiently maintained throughout the Dominion of Canada for the past year, the crews being appointed in accordance with the requirements of each particular section in which a life saving station has been established. In some localities it is found necessary to keep a crew permanently appointed. Other stations are run in charge of a permanent coxswain, who has a volunteer crew for service when required. Motor boats have now replaced the row boats of the past in many of the life-saving stations and they prove to be not only safer for the life saving crews, but also are of much greater assistance to those in danger, on account of their superiority in speed and handling.

The inspection of the life saving stations is carried out at regular intervals to ascertain that they are in an efficient condition.

The department undertakes to reward bravery in life saving at sea. Life saving in the rivers and on the coast should be brought to the attention of the Royal Canadian Humane Society, Hamilton, Ont., with a view of obtaining reward, as this department does not deal with such cases.

Particulars of services rendered by individual stations are given in the report of Vice-Admiral C. E. Kingsmill on the life saving service, which is appended at page 110.

## 7.—RADIOTELEGRAPHY.

The radiotelegraph branch was established in 1906 under the Department of Marine and Fisheries.



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Although stations were in operation for some years previous their inspection and control was not carried out in a regular manner. Upon the establishment of this branch, all radiotelegraph matters in the Dominion and the control of all stations whether government-owned or not were vested therein. In 1910 the branch was transferred to the Department of the Naval Service.

Under the Radiotelegraph Act, no wireless station is permitted to carry on operations without a license, and no operator is allowed to enter the service without a certificate of proficiency from this department.

The department holds examinations at different points throughout the Dominion to ascertain the qualifications of wireless operators. Application for admission to these examinations should be made to the Deputy Minister of the Naval Service.

During the past year one hundred and thirty-three candidates were examined. Out of this number fifty-three were successful.

The department has established a regular system of inspection to insure efficient service in all radiotelegraph stations.

The range of the Cape Race station has been increased to 500 miles by the erection of new steel tubular masts. As this station is located on the east coast of Newfoundland and is the first point of communication by wireless from ships at sea, the improvement thereof has been of great assistance to navigation.

On the east coast a complete chain of stations extends from Cape Race and Halifax to Port Arthur, Ont., a distance of over 2,000 miles. As a result ships are in range of communication by wireless from the time they approach within 500 miles of the east coast of Newfoundland until they arrive at Port Arthur.

The official acceptance test of the equipment at Port Nelson station, on the Hudson bay chain has been carried out and the station has been put in operation. The services of this station are very valuable to the Department of Railways and Canals for communicating with their officials carrying on operations in the Hudson Bay district and also to ships entering Hudson bay, which by wireless communication with Port Nelson and Le Pas stations are enabled to keep in constant touch with their home ports.

On the Pacific coast, stations forming a complete chain from Victoria to Prince Rupert not only provide means of communication with ships, but are also used to a great extent for commercial correspondence. All the Pacific coast stations are owned and operated by the department.

The number of radiotelegraph stations in the Dominion and on board Canadian ships has increased by 78, and is now 247. The following table shows the number of stations in operation and the corresponding number last year:

	1913-14.	1 14-15	Increase.
Government commercial stations.....	1	1	—
Coast stations.....	42	42	—
Government ship stations.....	21	24	3
Licensed ship stations.....	50	68	18
Licensed commercial stations.....	8	16	8
Licensed amateur stations.....	37	95	48
Licensed experimental stations.....	—	1	1
	169	247	78

On the 31st March, 1915, the Marconi Wireless Telegraph Company transferred to this department by agreement, the Sable Island and Camperdown Radiotelegraph stations.



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The total number of stations now owned by the Dominion Government is as follows:

On east coast chain.....	21
On great lakes chain.....	8
On west coast chain.....	10
On Hudson bay chain.....	2

The range of these stations varies from 100 to 500 miles. In addition to these the Marconi Wireless Telegraph Co. owns and operates under agreement, stations at Pictou, N.S. (range 100 miles), and at North Sydney (range 100 miles), and under license a trans-Atlantic station at Glace bay. The Universal Radio Syndicate operate under license a trans-Atlantic station at Newcastle, N.B.

The messages handled by the coast stations as compared with last year shew a decrease. This decrease is directly attributable to the war and to the placing of the coast stations on a war basis. Following is a comparative statement of messages handled by coast stations.

Service.	1913-14		1914-15		COMPARISON WITH 1913-14.		
	Messages.	Words.	Messages.	Words.	Increase or Decrease.	Messages.	Words.
East coast.....	145,605	2,443,145	59,846	1,196,512	Decrease...	85,759	1,246,633
Great lakes.....	9,601	219,786	15,785	326,505	Increase....	6,184	106,719
West coast.....	157,354	2,206,331	98,386	1,532,526	Decrease...	58,968	673,805
Totals.....	312,560	4,869,262	174,017	3,055,543	Not dec'ed	138,543	1,813,719

The number of messages handled by the ten west coast stations (operated directly by the department) is greater than that of the thirty east coast and great lakes stations combined, the figures being as follows:

West coast.....	Messages, 98,386
East coast and great lakes.....	“ 75,631

ASSISTANCE RENDERED TO SHIPS.

The value of an efficient radiotelegraph service was demonstrated on many occasions throughout the year, assistance rendered to disabled ships by means of this service having resulted in the saving of many lives and ships. Individual cases of assistance are cited in the report of the radiotelegraph branch.

CONSTRUCTION AND REPAIRS.

*East coast.*—A site for a proposed new station at Montreal has been purchased in the parish of Côte Saint-Michel and construction work will be undertaken during the coming year.

The reception range of the stations on the river and Gulf of St. Lawrence and on the east coast was increased by the installation of modern type receiving apparatus. A modern transmitting apparatus has also been installed in the Quebec station.



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*Great lakes.*—Repairs and improvements to the dwellings and sites in connection with the radiotelegraph stations at Kingston, Midland, Port Burwell and Toronto island have been carried out during the year.

*West coast.*—Improvements both to the apparatus and sites of the stations on the west coast have been made. Particulars of work done are given in the report of the radiotelegraph branch.

*Hudson bay and straits.*—A suitable site for a new station has been located on Mansel island in Hudson straits. Construction work will be undertaken during the coming year.

*Personnel.*—The total number of persons employed in connection with the radiotelegraph service is 327.

The report of C. P. Edwards, general superintendent of the radiotelegraph service is appended at page 116.

## GENERAL.

Considerable inconvenience has been experienced in the different branches by the enlistment of employees, particularly those entrusted with technical work.

I have much pleasure in expressing my satisfaction at the efficient manner in which officers of the department have carried out their duties during the year.

I have the honour to be, sir,

Your obedient servant.

G. J. DESBARATS,

*Deputy Minister.*



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The Deputy Minister,  
Department of Naval Service,  
Ottawa.

18th Nov. 1914.

SIR,—I have the honour to forward herewith Account of my diary for the northern expedition, from Nome till my return to Esquimalt.

I am, sir,  
Respectfully,

CAPT. BARTLETT.

## DIARY OF CAPTAIN BARTLETT.

*Sunday, July 13th, 1913.*—2 a.m. Came off to ship, having spent the previous day superintending the collection of supplies on Sesnon dock.

6 a.m. Lighter came off with gasoline, lumber, skins, etc.

Secured some stevedores from shore to work cargo.

8 a.m. Went on shore using life-saving launch.

2.30 p.m. Came on board.

3.30 p.m. Weighed anchor, proceeding to Teller, where we are to blow down boiler, overhaul engines, and fill up with fresh water.

At Nome 100 tons of coal taken on board with about sixty tons in sacks on deck, the balance going in the bunkers. A complete steering gear tackle was installed.

Sent on shore fireman Wiseman, he leaving of his own accord. Mr. Phillips took care of him. Stefansson and Phillips accompanied us for a short distance, returning to Nome on *Defiance*. Weather fine and clear, wind moderate. SW.

The scientists accompanying us were:—McKinley, Mamen, Mallock, Beauchat, Jeness, Doctor McKay.

A Mr. Corwin was a passenger to Teller.

7 p.m. Sledge island abeam, shape course for Cape York. Fine and clear, moderate W. wind.

*July 14.*—8 a.m. Close under the land, north side Port Clarence. Shape course to run down coast.

Noon. Came to anchor off Reindeer station, an ideal place to water ship. Mr. Brevick is in charge of this station. Shortly after anchoring went on shore and finding that I could come nearer shore, weighed anchor, moving ship within a quarter of a mile of station. Immediately began filling water-tanks, blew down boiler, and overhauling machinery. Used whale-boats to fill water.

*July 15th.*—Fine and clear through day, no wind, watering ship, some of the scientists on shore hunting.

*July 16th.*—Finished watering ship, also filling boiler. Sailors and some of the scientists restowing cargo in fore-hold. Also hold under dining-room, and lazarette. Quite a lot of stores had been shifted in Nome, and others taken on board at that place. I thought it a good opportunity to locate and get a line on where things actually were.



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*July 17th.*—Blowing strong wind north; sailors overhauling running gear and bending winter suits of sails. Some of the scientists on shore.

*July 18th.*—Light N.W. wind; as day advanced fresh breeze. All hands employed shifting coal sacks on deck and endeavouring to make room for one to walk. Engineers overhauling machinery.

*July 19th.*—Overhauled deer skins, sealskins and sheep-skins, that were obtained in Nome, and that owing to rush of getting things on board were mixed up with other supplies, the idea being to have a place for everything and easy to get at when required.

Secured three reindeer carcasses from deermen at Teller, paying them with supplies from ship. Lost whale-boat in strong wind this morning. Wind strong SW. Big surf on beach.

*July 20th.*—Blowing strong wind south; dropped second anchor veering out sixty fathoms on starboard, and thirty on port anchor.

*July 21st.*—Weather conditions similar to yesterday.

*July 22nd.*—Calm, with rain-showers. Stefansson telephoned from Nome to Teller asking me for some information loading ship. A man with motor launch delivered message. I returned with him to Teller and had conversation with Stefansson over phone. During the afternoon ship's boat came for me.

*July 23rd.*—Light variable winds. Rainshowers. Several scientists on shore, cutting grass for to use later on in foot wear. Watering ship.

*Alaska* arrived in Teller, heard *Mary Sachs* left Nome for Teller last night.

*July 24th.*—1 a.m. *Mary Sachs* alongside. Doctor Anderson came on board.

6 a.m. Transferred eleven sledges and various articles to *Karluk*. *Mary Sachs* proceeding to Teller. I forgot to mention yesterday Captain of *Alaska* asked me if I could spare second engineer to help make repairs to *Alaska's* engine. This morning despatched second engineer on *Sachs* to Teller for that purpose.

*July 25th.*—Calm, fine and clear. SS. *Corwin* alongside. Stefansson on board. Transferred 28 dogs from *Corwin* to *Karluk*, dogs obtained in Nome, also various other things were transferred. Watered ship to-day.

*July 26th.*—I went on shore with scientist—hunting; two members of party looking for Eskimo skulls. During afternoon raining. Stefansson telephoned from Teller to be ready for sea in four hours.

5 p.m. Second engineer came back from Teller, also note from Stefansson wanting to change *Karluk* sailor for another man. Later order rescinded. *Mary Sachs* alongside midnight.

*July 27th.*—Transfer 8 dogs from *Mary Sachs*, two sledges, one motor-whaleboat, and various other things.

3 a.m. Proceeded to sea. *Mary Sachs* in company. On *Karluk* beside officers and crew were Stefansson, Murray, McKay, Mamen, Mallock, Jeness, Beauchat, McKinley, McConnell, and a dog driver; when abreast Tin City a boat seen putting off from shore and making signals attracting our attention, changed ship's course, and was soon alongside boat which had a message from aviator Fowler, asking permission to bring his aeroplane on board *Karluk*; permission not granted.

2 p.m. Cape Prince of Wales abeam; shape course to round shoal off Cape; wind strong W. *Mary Sachs* some distance astern. Steam back meeting *Mary Sachs*. Wilkins was transferred from *Mary Sachs* to *Karluk*. *Karluk* then proceeded on her course. Wind strong with rising sea, and thick fog. Ship making poor way. Set mainstaysail, putting ship on starboard tack with her head toward Siberian coast.

*July 28th.*—Dense fog, strong W. wind, moderate sea.

2 a.m. Steering gear gave out, soon had it repaired.



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8 a.m. Set reef mainstaysail and forestaysail. Put ship on port tack with her head toward the American shore. Ship making good way. Wind hauling to N.N.W.

*July 29th.*—Early morning fresh breeze, north increasing as day wore on. Noon—moderate gale, dense fog, took in second reef mainstaysail. During afternoon, sun breaking through fog bank. Fog thinning overhead, wind moderating a little, rough sea. Ship making good weather.

*July 30th.*—4 a.m. Fog lifting, wind strong NNE. Land two points on weatherbow.

11 a.m. Fine and clear, close under Cape Thompson. Steaming northwards for Point Hope.

10 p.m. Anchored to the eastward of the village. Eskimo on board trading. Shortly before midnight weighed anchor, moved nearer to village. Stefansson trading for furs and skin boats, etc.

*July 31st.*—Early hours in morning Stefansson went on shore, and at this place two native boys came on board to join the expedition.

7.15 a.m. Weighed anchor, steaming to north side Point Hope where some more trading was done.

9 a.m. Proceeded to the eastward, set all sail. Wind fresh SSE.

11.30 a.m. Cape Lisburne abeam. Squally. Shape course to go ten miles outside Blossom shoals.

*Aug. 1st.*—Early hours of morning wind hauled to NE. Made fast all sail. Water getting smooth. Indications of ice on our weather.

6 p.m. Ice two miles on weather bow. For some time the ice blink and the colour of the water, the temperature as well, gave indications of the nearness of ice.

11 p.m. Ship could not lay her course. Ice running toward land.

11.30 p.m. Ice close to land. Turned around steamed back to westward in open water.

*Aug. 2nd.*—During the early hours of morning ice opened, steamed to the eastward among loose ice.

8 a.m. Ice getting closer. Turned round, steamed back to open water again. During the afternoon ice loosened up, made another attempt to get to the eastward, shot polar bear this afternoon. Calm, dull and cloudy.

*Aug. 3rd.*—Wind SSWS.

6 a.m. Further progress to the eastward barred. We are now about four miles off Seahorse island.

11 a.m. Stefansson with two Eskimos, one sledge and dogs went on shore; we are only two miles from land. Doctor and dog-driver accompanied him; midnight—the two Eskimos and dog-driver returned to ship. Stefansson and McKay walking to Cape Smythe. Wind moderate SW., ship moving in floe eastward.

*Aug. 4th.*—Ship jammed all day, and slowly moving with pack to the eastward. No pressure of ice to ship. Watered ship from floe.

*Aug. 5th.*—Wind S.W. Ship still jammed, but moving with floe to the eastward.

8 p.m. Wind N.W. fresh—lanes of water making parallel to shore. A little before midnight snowing.

*Aug. 6th.*—2 a.m. Under way. Shortly afterwards carried away tiller. Bent a new one, and proceeded on our way at 4 a.m. Ice loose, ship making fair progress.

10 a.m. One mile from Cape Smythe. Ice tight between ship and shore. Midnight Stefansson, Hadley, Eskimo family (husband, wife and two children) and Katektovick (Eskimo) came on board to become members of expedition.



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The dog-driver wanted his discharge and was sent on shore. Mail was also sent on shore. From here we obtained three skin boats, two kayaks, also a number of skins. Kurillick brought along three of his own dogs.

*Aug. 7th.*—During early hours of the morning, the ship still being beset in ice began to move with the floe to the eastward, and on getting clear of the grounded floes off Point Barrow began moving in a NW. direction. To the eastward of the Point, a good deal of open water visible. The ice that we are in is light and smashed up a good deal. We are about three miles from the edge of the water.

*Aug. 8th.*—Ship jammed all day. Open water three miles from us. This afternoon Point Barrow bearing SE. by S. ten miles. Light variable winds. Fine and clear. Watered ship from floe.

*Aug. 9th.*—7 a.m. Fine and clear, ice opened. Ship under way at 8 a.m. Little difficulty getting to open water.

9 a.m. In open water. Ice close packed on port side, which tended to bring us close to shore, using hand lead continuously. As we steamed eastward parallel with shore and at times barely enough water, ice became looser. Lead going continuously, navigation precarious.

*Aug. 10th.*—Steaming in loose, light ice and lanes of water. Ice close to shore. One has to go very near shore, therefore, at times in shallow water, lead going constantly.

10 a.m. Ship grounded, but an hour afterwards floated without any assistance. Ice close to the Thetis islands, here followed the straight edge until at length a point of ice ran close in shore and was grounded. In trying to negotiate it, ship grounded again—backed her off and now tried to cut through the point or tongue of ice. Ice was very light, and broken up, but notwithstanding all this it was a heartbreaking task to get the ship through. As a matter of fact, it was only two hundred yards wide. At length reached open water; then steamed eastward, following edge of pack on port side for some hours—lead going constantly; toward Cross island ice looser, but heavier.

*Aug. 11th.*—Calm, ice loose, ship making good way.

9 a.m. had to make a detour back to SW. and try to negotiate passage to the north of Cross island.

5 p.m. Ice close-packed on our port side. Turn ship in shore. Latter worked ship inside of line reef. Several members of expedition on shore. Inside the reef loose ice, shallow water; strong currents keep ice moving.

*Aug. 12th.*—Wind moderate, NW. varying to SW. Ice opening to the NE. Ship under way 3 p.m. and steaming in loose ice in a NE. direction. We have some of the stem plates loose, and below the water-line two are gone.

8 p.m. Ship stopped; Flaxman Island bore SW. twenty miles. No open water to the eastward. The ice where we are is light, and holes of water all through it, but ship is not equal to forcing her way through it. Whilst we stopped Murray used the dredge.

*Aug. 13th.*—Fast in ice. Calm, light, variable winds. Open water of yesterday closed up. Ship and ice stationary.

*Aug. 14th.*—Light variable winds.

7 p.m. Made an attempt to force our way toward land, but unable to do anything with it.

*Aug. 15th.*—Similar weather conditions as yesterday. Ship stationary.

*Aug. 16th.*—Ship still in same position.

*Aug. 17th.*—Calm, ship still in same position.

*Aug. 18th.*—Light north wind. Snowing. No ice moving.

*Aug. 19th.*—Ship same position as yesterday. Similar weather.

*Aug. 20th.*—Calm and hazy. Ship in same position.



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*Aug. 21st.*—Light east wind. Later moderate NE. Leads of water about one mile from ship, trending toward shore. Water-sky visible to the eastward. Romanzoff and Franklin Mountains visible about thirty miles.

*Aug. 22nd.*—Moderate north wind—Stefansson decided to send Jeness and Beauchat on shore.

*Aug. 23rd.*—Moderate north wind, making preparations for departure Jeness and Beauchat. The dogs which were on deck placed on the ice.

*Aug. 24th.*—Variable winds, squally at intervals, ice opening to the eastward. Lanes of water about two miles from ship and running at right angles to the shore. Very little difference in ship's position.

*Aug. 25th.*—Light variable winds, no water seen.

*Aug. 26th.*—Light north wind, ship changed position moving a few miles to the westward.

*Aug. 27th.*—Light variable winds, thick snow falling. Toward the afternoon wind moderate east, ship in pack moving westward.

*Aug. 28th.*—Wind light west. Fine and clear. Romanzoff and Franklin Mountains visible.

*Aug. 29th.*—Wind light WSW. During afternoon south.

11 a.m. Jeness and Beauchat left ship for land which is about ten miles distant. One sledge and 7 dogs carried provisions. One sledge and 7 dogs carried skin boat. The supporting party consisted of Wilkins, McConnell, and McKay. Three Eskimos went along with them, when about two miles from ship Stefansson met them and he decided owing to the rough ice that they should come back and, further, that they had in that short distance so damaged the skin boat that it was necessary to return and repair it.

*Aug. 30th.*—Wind south to SW. Foggy at intervals.

Ship in ice slowly moving to the west.

*Aug. 31st.*—Variable winds, cloudy towards land. Soundings to-day 19 fathoms, pebbles and mud. Clear at night.

*Sept. 1st.*—Strong NE. wind, fine and clear, ship moving with pack westward. The stores which had been left by the shore party removed to the ship.

*Sept. 2nd.*—Strong ENE. gale, no water visible, fine and clear. Ship moving in pack to westward.

*Sept. 3rd.*—Moderate gale, ENE. wind, open water; distance two miles; hazy, thick snow during afternoon.

*Sept. 4th.*—Gale still continues, weather cloudy, Eskimo and members of expedition hunting; four seals shot today, also quite a number of ducks.

*Sept. 5th.*—Wind moderating, noon—fresh breezes; dense fog. Eskimo shot four seals, and a few ducks.

*Sept. 6th.*—Ship is drifted considerable to the WSW. Can see from aloft the lowland on our port side, about five to seven miles distance. Fine, clear and calm. Foggy during night.

*Sept. 7th.*—Calm and foggy all day. Winds light and variable. One seal shot.

*Sept. 8th.*—Light airs, fog and snow.

*Sept. 9th.*—Ship moving with flow to the SW., soundings, 12 fathoms. Thetis island about five miles on port beam. Eskimo shot five seals, but recovered only three, they having sunk.

*Sept. 10th.*—Light and variable winds, ship stationary, one seal shot to-day.

*Sept. 30.*—9.30 a.m. Fine, sky overcast. Thermometer freezing. The open water being about  $1\frac{1}{2}$  miles from ship, decided to take a canoe and hunt birds. The single-barrel shot guns were too light. What I mean is that one could not get near enough to shoot with good effect, and the amount of the charge in shot guns is not sufficient to kill at a long distance, especially ducks, for as we know, these birds are well feathered. However, we managed to get about fifty birds.



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6 p.m. Returned to ship. A beautiful day, all through. Ship and ice practically stationary.

*Sept. 12th.*—Sky overcast, dull and cloudy. Some of us used ski in walking to the lead, and found the travelling good. Light snow. The light to-day very bad to travel. Wind moderate NNE. Ice moving toward land. Late this evening water closed up. Eskimo shot several seals.

*Sept. 13th.*—3 a.m. Fine and clear, very frosty, wind fresh NE. Some of us early this morning went hunting, but could find no open water, the ice having rafted with the wind last night. Latitude by observation  $70^{\circ}48'$ . Put up stove in dinning-room.

*Sept. 14th.*—Dull and cloudy, wind NNE. Ship stationary. Some of us duck shooting. Killed quite a number of birds, had great difficulty in getting them owing to young ice in lead water.

*Sept. 15th.*—6 a.m. Dull and cloudy, a good deal of condensation to-day. Several members of party hunting. We used ski in our going about.

*Sept. 16th.*—A number of members out hunting. Some of them going a long distance from ship, and return late in the evening. Some were very successful, while others were not so fortunate.

*Sept. 17th.*—Fine, clear and calm. All hands hunting to-day.

5 p.m. All hands on board. Lighted the lamp for the first time in dining-room. Ship stationary.

*Sept. 18th.*—Calm. Very spring-like. Several seal shot, latitude  $70^{\circ}46'40''$ , Long.  $150^{\circ}20'$  West.

*Sept. 19th.*—Fine and clear, strong NE. wind, Lat.  $70^{\circ}47'14''$ —Long.  $150^{\circ}12'$  W. Thermometer 8. Ship stationary.

*Sept. 20th.*—Begin strong E. wind. Sky overcast. Noon—sunshine.

1.30 p.m. Stefansson with two Eskimos McConnell, Wilkins, Jeness, and twelve dogs, two sledges, with the following supplies left for the land:—

- 2 Burberry tents.
- 1 stove and piping.
- 2 axes.
- 1 dozen candles.
- 4 gal. alcohol.
- 1 alcohol stove.
- 1 box dog biscuit.
- 6 tins tabloid tea.
- 10 lb. sugar.
- Matches.
- 3 sleeping bags.
- Sheepskins for sleeping robes.
- 2 floor canvas for tents.
- 4 slabs of bacon.
- 10 lb. lard.
- 120 lb. fish.
- 20 lb. rice.
- 1 box tin beef.
- 5 lb. salt.
- 1 case Underwood man pemmican.
- 15 lb. chocolate.
- 1 box biscuits.
- Mannlicker rifle and shot gun.
- Ammunition (not quite sure amount)
- 1 camp cooking set.
- 6 seal floats.



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He left the following instructions with me:—

C. G. S. *Karluk*,  
Sept. 20th, 1913.

DEAR CAPT. BARTLETT,—On the trip for which I am leaving the *Karluk* to-day, I expect to make land on the largest second from the west of the Jones islands (Thetis island). If the ice is strong enough I expect to cross thence to near Beechy point to hunt cariboo. If feasible, I may go on to the mouth of Itkuilik river known to the Eskimos as Itkillkpe to see if fish can be purchased there from the natives. Should the *Karluk* during our absence be driven from her present position it will be well for you so soon as she has come to a stop again, and as soon as it appears safe to send party ashore to erect one or more beacons, giving information of the ship's location if she goes east. The beacon should be erected on accessible islands; if west, they should be at Cape Halkett, Pitt point, or Point Simpson, to facilitate the finding of the ship in fog or a blizzard by our party coming from shore or by hunters who are overtaken by thick weather.

While away from the ship, it will be well to have established four lines of beacons, running in the four cardinal directions from the ship to as great a distance as practicable. There should be some arrangement by which these beacons indicate in what direction the ship is from each of them; and some of them should have the distance of the ship marked upon them. These beacons need not be large, but should not be over 100 yards apart, to be used in thick weather. Flags or other fluttering things should not be used, for bears might be scared away by them. On days when an unsure wind is blowing, it might be desirable that McKay run line of soundings in various directions from the ship. If it becomes practicable to send off Mallock and Mamen for surveying purposes, McKinley should accompany them, for the purpose of establishing magnetic stations in connection with Mallock's survey; Mallock locating the stations for McKinley, so as to save unnecessary duplications of instruments.

Except for some special reason, the Eskimo woman Keruk should be kept busy sewing boots for the winter, sea-ice type, deer legs and ugoug soles. It is likely that we shall be back to the ship in ten days if no accident happens.

(Signed) STEFANSSON.

McKinley rigged up an anemometer in crow-nest.

Sept. 21st.—Begins with strong E. wind, dull and cloudy, more wind as day wore on. Temperature—27. Began making clothes and preparing for departure of Mallock and Mamen, using sewing machine at tents.

Sept. 22nd.—Dull and cloudy all day. Late in afternoon sleet. Set up tidal gauge. Ship still stationary.

Sept. 23rd.—Begins strong E. wind, increasing to moderate gale.

10 a.m. Ship and ice pack began moving westward. I had been watching all morning, using the lead as a guide. During afternoon snowing, very mild. The canoe which was by the side of the lead taken on board.

Sept. 24th.—Wind moderating. Noon light ESS. wind, very mild all day. Eskimo killed three seal. A good deal of water to the NE. Very little drift this afternoon. Late in evening wind increasing to moderate gale, NNE.

Sept. 25th.—Begins with NNE. gale, a good deal of snowdrift on ice. Noon—during a clear-up caught sight of land, soon after thick snow. Ship rapidly driving in ice path. A good deal of open water to the SE. Had all the dogs taken on board, also sledges. The ship during all this time remains firm in ice, and the sheet we are in unbroken, although at times water all around.

Sept. 26th.—4 a.m. Wind moderating, varying to NW. Water closing up, sky overcast, snowdrift. Put dogs onto ice again. Soundings 8 a.m., 18 $\frac{3}{4}$



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fathoms. According to the chart, we are a little to the eastward of Point Barrow. Eskimo shot three seal. Other members of expedition hunting. Very mild all day. Filled water from ice floe.

*Sept. 27th.*—Wind, light NW., mild and spring-like. Good deal open water to the NW., and as far as East; from aloft grounded ice plainly to be seen on our port side. Shot four seal.

*Sept. 28th.*—Begins with light snow, wind moderate NE. Weather mild. Soundings 8 a.m., 11½ fathoms. Ship slowly driving with pack to the westward. Began to-day making fur clothing in order to have warm clothes in the event of having to leave the ship. From time to time we have been making preparations for such contingency, and have the whale-boats provisioned for twenty days, and a couple of months' supply on deck ready to throw overboard at any moment. All the jaeger underwear I have packed in canvas bags. Lat. 71° 10' 55"—Long. 154° 6' 45" W.

*Sept. 29th.*—Moderate NE. wind. Wind light, snowing. Restowed boxes in forward hold, so as to make room for carpenter shop. Installed stove which makes it quite comfortable; made up all the tan deerskins in small bundles so that they could be handled readily, placing them on deck.

4 p.m. Weather cleared up, but not clear enough to see far.

*Sept. 30th.*—Began fine and clear, calm.

8 a.m. Sky overcast. Ship slowly driving in pack to the westward. Can see distinctly the lowland of Copper island. Began building sledges designed after the Peary sledge of 1909.

*Oct. 1st.*—Dull and cloudy.

6 a.m. Water made short distance from ship, the narrow lane running east and west.

8 a.m. Snowing; strong NE. wind and snowdrift. Ship driving fast in pack. During the afternoon lead closed up. Owing to the snow filling the boats in the davits, we were forced to put on the canvas covers. The boats are provisioned 20 days rations for eight people, each boat.

*Oct. 2nd.*—Daylight, wind moderating and shortly afterwards veered to the SE. Noon—sun came out. Lat 71° 17'. Afternoon clear up. Land about five miles bearing from S.E. by S.S.W. Some water to the NW.

3.30 p.m. Ship and pack began setting to NE. Sounding 8 fathoms. Long. 155° 12' W.

*Oct. 3rd.*—Wind fresh NE., fine and clear. Lowland bearing from E. to W., no water under land. Afternoon wind stronger, open water in a few places. The lead near the ship opened a little. Up to 3 p.m. ship moving with pack slowly westward. After this drift more rapid. Lat. 71° 14', Long. 155°.

*Oct. 4th.*—2 a.m. Wind lulled. Daylight—moderate SE. wind, dull and cloudy. Noon—raining, open water to the SE. A brilliant sunset. Eskimo shot two seal. Shifted coals from poop to port bunker.

*Oct. 5th.*—Begins fine and clear, moderate SE. wind. Bright sunshine. Open water visible from NW. to N. Killed three seal. Lat. 71° 26'. Long. 154° W.

*Oct. 6th.*—Moderate SE. wind. As day advanced wind increasing to moderate gale. Ship in pack rapidly moving to the NW.

7 a.m. Soundings 28 fathoms. The dredge finds a different kind of sea fauna—now that we are outside the 20 fathom curve. Day very mild. We are getting soft shell crabs, coral, etc., and losing the mud and silt. Lat. Noon 71° 37'—Long. 154° 38' W. Midnight Lat. 71° 38'—Long. 154° 10' W.

*Oct. 7th.*—Fresh SE. wind—horizon clear.

6 a.m. Condensation, lasting up till noon. Sun shining, condensation drying up. Gave sailors jaeger underclothing, Burberry overhauls, mitts and stockings, and two sheepskins a man.



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8 a.m. Soundings 25 fathoms. Lat.  $71^{\circ} 38' W$ —Long.  $154^{\circ} 5' W$ .

*Oct. 8th.*—Beginning day—strong NE. wind. All day similar weather—late in afternoon clearing. Water sky to S. and W. Lat.  $71^{\circ} 39'$ . Soundings 26 fathoms.

*Oct. 9th.*—4 a.m. Strong NNE. wind, ship in pack rapidly driving westward. Soundings 56 fathoms.

8 a.m. 68 fathoms.

10 a.m. 72 fathoms.

11 a.m. 77 fathoms.

Lat. Noon— $71^{\circ} 47'$ —Long.  $154^{\circ} 19' W$ .

2 p.m. Wind hauling to NW., snow squalls, ice rafting, and breaking up. The sheet that we are in still remains unbroken. Soundings 85 fathoms 4 p.m. Ice under great pressure. No movement of ship; using dredge all day. Very little result. Probably we are drifting too rapidly.

5 p.m. Sounding 86 fathoms.

9 p.m. 95 fathoms. Hard bottom. Sky overcast, air filled with condensation.

*Oct. 10th.*—Begins fine and clear, hard frost, no water visible. Soundings 3 a.m., 180 fathoms—no bottom. We are now on the downward slope of the Continental shelf.

7 a.m. No bottom, 140.

8 a.m. No bottom, 270.

Lat. at Noon— $72^{\circ} 18'$ . Cold, clear and frosty. Noon—bent on 300 fathoms. more wire to Kelvin machine; no bottom 500 fathoms. Wind NNE. veering back to north. Getting the Locus machine together and installing it on ice near the ship. Wind also appears to moderate.

6 p.m. Lat. by altair— $72^{\circ} 12'$ —Long.  $154^{\circ} 21' W$ . Eskimo woman finished 15 pairs deerskin boots.

*Oct. 11th.*—Begins fine and clear. Temperature  $-6$ .

9 a.m. Sky overcast. Air growing milder. Light snow. The dog which strayed away yesterday came back. I appreciate its return. Dogs with us are at a premium. Return the dogs onto the ice. Noon—Locus machine gave 1,000 fathoms. Mud and sand; getting the dredge ready. Filled fresh water tank by melting ice in tank from steam. Eskimo woman sewing skin clothing. Heavy pressure ridge about 1,000 yards stern of ship.

*Oct. 12th.*—Begins dull and cloudy, little or no wind. Gave scientist outfit skin clothing. Noon—sounding 1,215 fathoms. Brown mud and sand. To the NE. and E. water sky visible wind light SE. Thermometer 16. Have ceased to tie up the dogs, letting them run around. The great trouble is that when running around loose they quarrel a good deal, and the weak succumb to the stronger. Under the present circumstances, we cannot take any chances of thus losing the few dogs we have, although the dogs would be much better loose.

*Oct. 13th.*—Dull and cloudy, air mild, wind light SE. Dredge has been down but does not seem to fish well. Began cutting out ship. When the ship was first frozen in the ice, which was about the middle of August, she at that time was very heavy in the water. Since then we have burned quite a lot of coal, also removed the deck load which makes the ship two feet lighter. In the event of ice pressure, the ship can have a better chance and by now floating her can be raised at least two feet out of the water, and by cutting up small pieces of ice and placing it between the ship's side and the rim of the ice cradle, she in this way has a good cushion to protect her in the event of a squeeze. About twenty



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yards on our port quarter is a small heavy blue floe, about one-quarter of an acre in size. I have placed on this the following:—

250 sacks coal;	19 barrels of molasses;
33 cases gasoline;	9 sledges;
6 cases codfish;	2,000 feet lumber;
3 large cases cod steak;	3 coal stoves;
5 drums of alcohol;	2 wood stoves;
4 cases of eggs;	About 90 ft. of piping;
114 cases of biscuit;	1 suit sails belonging to ship;
5 barrels of beef;	2 Peterboro canoes.

With these things one can make a pretty comfortable house, using the sacks of coal, cases of biscuit, and barrels, etc., to make the walls, and the lumber for flooring, the scantling for a roof, and the sails to cover all. Further, the outbreak of fire on the ship was always imminent, although, we had made ample provision to safeguard that. Soundings at noon—1,200 fathoms, mud. Used to-day a lead made by the engineers.

4 p.m. The dredge again was lowered with 1,500 fathoms of rope attached. This rope belonged to the ship. The dredge remained down all night.

10 p.m. Lat. by altair  $72^{\circ} 23' 30''$ —Long.  $155^{\circ} 3' W$ . Wind SW. light.

*Oct. 14th.*—Begins dull, and cloudy. Laying crushed ice along ship. Cut away the hard piece of ice under the port quarter; also freed propeller and rudder. Hauled up dredge, rope broke, 300 fathoms from dredge. This afternoon lowered another, attached 1,300 fathoms rope. Wind NW, ship driving S. in pack. Open water visible to the S. To-night discontinued the usual routine of watch and watch; instead appointed a night and day watchman.

*Oct. 15th.*—Fresh NW. wind. Sky overcast. Air filled with condensation.

9 a.m. Hauled dredge, owing to its being fouled it was empty on reaching the surface. Noon—sounding 1,165 fathoms. Soft mud.

4 p.m. Lowered dredge. This was a larger and a better one; the engineer department making it. The bottom of netting contained fine mosquito netting so as to hold any minute animal life. Crew banking up ship. I notice the mud core when taken from the buchanan tube the top has a brownish colour, whereas the bottom is bluish. Lat. 3 p.m.,  $72^{\circ} 23'$ —Long.  $155^{\circ} 13' W$ .

*Oct. 16th.*—Dull and cloudy, wind moderate SE. Noon hauled dredge. Had two animals, one a brittle starfish, the other a spherical shape creature unknown to Murray. During the afternoon, wind strong NW. Leads making near ship.

8 p.m. Shifted the dredge line to ship. Fine, clear. Brilliant moonlight. Lat. 6 p.m.  $72^{\circ} 23'$ —Long.  $155^{\circ} 21' W$ .

*Oct. 17th.*—Fine and clear. Moderate NW. wind. Thermometer —4. Lat. Noon  $72^{\circ} 19'$ , Long.  $155^{\circ} 24' W$ . 6 p.m. Lat.  $72^{\circ} 20'$ —Long.  $155^{\circ} 5' W$ . Collected all the skins left after giving the men an outfit, and put them in canvas bags. Had the sailors start in and sew up the Underwood pemmican in 48 lb. packages. Of course, the tins were taken out of the wooden case. The canvas was very light, and only strong enough to keep the tins together.

8 p.m. Cloudy and calm. Thermometer rising. Murray repairing dredge.

*Oct. 18th.*—Fine and clear. Temperature 4. Wind NE. Sounding 955 fathoms. Put down dredge, down all day. Lat.  $72^{\circ} 26'$ —Long.  $155^{\circ} 4' W$ .

*Oct. 19th.*—Early this morning fine and clear. Lat.  $72^{\circ} 27'$ , Long.  $155^{\circ} 27' W$ . Wind strong NNE. A narrow lead water made short distance from ship. Eskimo shot four seal. Noon—hauled up dredge, had one starfish.



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6 p.m. Lat.  $72^{\circ} 29'$ —Long.  $155^{\circ} 51'$  W. Gave out sheepskins all on board. Noon sounding 940 fathoms.

*Oct. 20th.*—Fine and clear. Light NNE. wind. Noon lowered dredge. Sounding 940 fathoms. Lat.  $72^{\circ} 31'$ . Eskimo shot two seal. Saw bear track near ship. Installed a 100-gal. galvanized boiler in galley to hold melting ice. It was made by the engineer department.

*Oct. 21st.*—After breakfast hauled dredge. 1,300 fathoms of line out. Dredge unsuccessful.

11 a.m. Soundings, 750 fathoms. Lat. at noon  $72^{\circ} 30'$ . Lost one of the dogs in a fight last night. Eskimo made small sledge for canoe. Lowered dredge this afternoon.

*Oct. 22nd.*—Dull and cloudy. Wind SSE. Hauled dredge. Nothing in it. Sounding 968 fathoms. Noon—wind strong SSE. 8 p.m. Sky clear, Lat.  $72^{\circ} 33'$ —Long.  $156^{\circ} 56'$  W. Midnight.

*Oct. 23rd.*—Blowing a gale SSE.

4 a.m. Wind let up a little, and veered to the NW. Still blowing strong. In narrow lane of water, a short distance from ship, Eskimo shot two seal. Soundings, 920 fathoms. This afternoon Eskimo shot six seal, eight for day. To-day, soundings made a depth of 500 fathoms to ascertain temperature, gave following:—

Surface—1.07 Centigrade.

100 fathoms—1.02 Centigrade.

500 fathoms—1.14 Centigrade.

*Oct. 24th.*—Begins wind strong S. Snowing. All the leads of water closed. Eskimo obtained no seal, soundings 1,001 fathoms. Temperature at bottom—0.45 Centigrade. Late afternoon, wind light; fine and clear.

*Oct. 25th.*—Dull and cloudy up to noon. Noon soundings, no bottom at 1,000 fathoms. Murray to-day used a fish net, securing several specimens. A few small leads of water in which Eskimo secured several seal. Lat. 4 p.m.  $72^{\circ} 34'$ —Long.  $155^{\circ} 40'$ .

*Oct. 26th.*—Dull and cloudy, moderate S. wind. During the night three bears visited the ship. Strange the dogs did not scent the presence of the bears. The young ice in the leads near the ship rafting. No water to-day, and no seals shot, although Eskimo had been scouting round searching for water-holes. Sounding, 1,115 fathoms, blue mud. It may seem strange in speaking about Eskimo always killing the seal, yet the members of the expedition at times are out, but were not so successful as the natives.

*Oct. 27th.*—No water to-day, and no seals. Started in on two meals. Breakfast 9 a.m. Dinner, 4.30 p.m. A cup of tea can be obtained about one o'clock, and before retiring, should any one care they can have tea or coffee or cocoa, or chocolate. Blew down the boiler, wind NW. all day. Thermometer plus 24.

7 p.m. Lat.  $72^{\circ} 32'$ —Long.  $155^{\circ} 35'$ .

*Oct. 28th.*—Dull and cloudy. Little sun shining at intervals during the day. Making preparations to unhang rudder. Wind light WNE.

11 p.m. Lat.  $72^{\circ} 30'$ —Long.  $155^{\circ} 35'$  W.

*Oct. 29th.*—Fine, clear and calm. Temperature—24. Rudder all ready to unship. Evidently this rudder has never been shifted since first it was installed on the ship. Magnificent aurora display, beginning at 7.30 p.m., lasting till 11 p.m. Lat. 4 p.m.  $72^{\circ} 24'$  N.—Long.  $155^{\circ} 37'$  W.

*Oct. 30th.*—Begins gale NE. increased into hurricane as day wore on, attended by blinding snowdrift.

8 p.m. Ice cracked with a loud report from stem of ship. Shortly afterwards another crack about 50 feet on port quarter, running parallel with ship.



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Soon had all the dogs on board, also the two sounding machines. About that time the crack closed again, the ship did not feel the least motion; there was no lateral movement of ice. Had all hands standing by the rest of the night. Toward midnight, wind veered to ENE. Clear. Thermometer—24. Lat.  $72^{\circ} 21'$ —Long.  $155^{\circ} 42' W$ .

*Oct. 31st.*—Strong gale and low thermometer. It is intensely cold; blinding snowdrift; ice open a little, but again closed.

8 p.m. Wind moderate. Auroral display to-night. Lat. 10 p.m.,  $72^{\circ} 19'$ —Long.  $156^{\circ} 39'$ .

*Nov. 1st.*—Begins with renewed violence of gale. Toward 8 a.m., squally; when light enough, I walked around the ship; only one crack in ice to be seen. A greater distance from the ship conditions were unchanged.

10 a.m. Soundings. 105 fathoms. A pronounced NW. drift. As day wore on wind moderating. Pump ship with hand pump in engine room. Have been doing it on deck, but with great difficulty, owing to it being so cold. With the boiler blown down, we have a stove in engine room which keeps the temperature above freezing. A clear sky, in fact, it is unusually clear; a magnificent display of aurora.

8 p.m. A living gale, with rising thermometer. The dredge has been out since the gale started, and when the wind moderated, we began dragging it in, and found that the line had parted several hundred fathoms from the dredge. We now bent another and lowered it again. It was down about an hour, and when hauled it had one starfish. Lat. 10 p.m.,  $72^{\circ} 13'$ —Long.  $157^{\circ} 5' W$ . Have built an observatory for Mallock, covering in the bridge with boards and sails. Mallock has his transit erected here, and is untiring in his efforts to get observations.

*Nov. 2nd.*—Wind shows no sign of letting up.

9.30 a.m. Soundings, 36 fathoms. Wind a living gale, and getting stronger as day wore on. Air filled with blinding snowdrift.

10 p.m. Wind moderating and hauling to the eastward. In the dredge good catches were obtained. As to quality, doubtful. Number of specimens not already found were secured. Amongst them some examples of starfish. All hands busily employed sewing skin clothing.

*Nov. 3rd.*—Begins, still blowing hard, with snowdrift. Toward daylight, wind let up a little. Sky overcast, still thick with snowdrift. Sounding 10 a.m., 36 fathoms. We are using the Kelvin glass tubes in our soundings; using dredge but not successful as yesterday.

*Nov. 4th.*—During early hours of morning, wind moderating, snowdrift as bad as ever. Sounding 10 a.m., 28 fathoms. Weather clearing up. Wind moderating. Afternoon, wind N. moderate breeze. Later on, wind began with renewed violence; using dredge; discovered a new animal. Murray does not know what it is. Gave deerskin boots to McKay, Mamen, Murray, and Beauchat. Lat.  $71^{\circ} 51'$  6 p.m.

*Nov. 5th.*—Clear, overcast sky, wind light ENE.

9.30 a.m. Sounding, 24 fathoms. Latter part of day fresh wind. Open water about two miles from ship; using dredge.

4 p.m. Lat.  $72^{\circ} 12'$ —11 p.m.  $72^{\circ} 15'$ —Long.  $159^{\circ} 10' W$ .

*Nov. 6th.*—Sounding, 9.30 a.m., 25 fathoms. Fine and clear; wind, light NE. Using dredge. Good catches. Engineers chipping inside boiler.

*Nov. 7th.*—Sounding, 9.30 a.m.,  $23\frac{1}{2}$  fathoms. Dull, overcast sky. Light variable winds. Open water two miles from ship. Eskimo shot ten seal. Wind fresh E. with condensation. Lat.  $72^{\circ} 16'$ —Long.  $159^{\circ} 18' W$ . Using dredge.

*Nov. 8th.*—Fine, moderate, east wind. Eskimo brought in the seals shot yesterday. During afternoon, strong ESE. wind. The lead of open water seen yesterday and where the seals were shot, is closed up.



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Sounding, 9.30 a.m., 24 fathoms. 11 p.m. Lat. 72.27—Long. 159.51 W.

*Nov. 9th.*—ESE. gale. Horizon clear. Overcast sky. Sounding 10 a.m., 23 fathoms. Ship moving fast in ice pack, NW. Noon—wind, moderate gale; SE. Thick snowdrift; using dredge.

*Nov. 10th.*—Light SE. wind. Fine and clear.

9.30 a.m. Sounding 27 fathoms. Fine and clear.

1 p.m. Fresh S. wind. A spring-like day. Temperature, 23. Late afternoon, strong wind. Eskimo killed six seal three miles from ship, also young polar bear. Mate reports ship making more water than usual. Put clean snow on deck. Removed the gang-way, making a road level with deck to the ice. Lat. 4 p.m. 72° 45'—Long. 160° 45' W.

*Nov. 11th.*—Strong S. wind and snowdrift. Daylight snowing; wind moderating.

9.30 a.m. Sounding, 29 fathoms. Eskimo brought in seal killed yesterday, also bear, and killed three more seal to-day. Lat. 4 p.m., 72° 53'—Long 161° 4' W.; wind, moderate and hauling to SW. Fine and mild all day. Using dredge. The sun leaves us to-day.

8 p.m. Fresh NW. wind.

*Nov. 12th.*—9.30 a.m. Fresh NW. wind. Dull and cloudy. Eskimo returned early. No water and no seal. Had to tie up dogs owing to their fighting.

10 a.m. Soundings, 29 fathoms. Lat. 4 p.m. 72° 53'—Long. 161° 32'.

*Nov. 13th.*—Strong NW. wind. Sounding, 9.30 a.m., 22 fathoms. Fine and clear. Had the Eskimo block up starboard door and cover in skylights with snow blocks. Brilliant moonlight. Wonderful display of aurora. Put clean snow on deck. Lat. 72° 46'—Long. 161° 34' at 4 p.m. Using dredge.

*Nov. 14th.*—Wind W NW. fresh. Fine and clear. Later, squally.

9.30 a.m. Sounding, 22½ fathoms. Blue mud.

Noon—Saw a little of the sun's upper limb. This, of course, was owing to the big refraction. Eskimo cutting snow blocks and banking up sides of ship. Also building snow shelters on deck against the entrance to dining-room. Using dredge. Temperature —18. Lat. 72° 39'—Long. 161° 29' W.

*Nov. 15th.*—10 a.m. Light SW. wind. Fine and clear. Sounding, 20 fathoms.

3 p.m. Wind, SE. increasing to gale. Snowdrift on ice. Sky overcast.

8 p.m. Wind moderating. Thermometer +15°. Getting the ship banked round with a couple of feet of snow. It makes an awful lot of difference to the temperature inside, beside a great saving in coal. Had the Eskimo hunting. They return without getting anything and report no open water.

*Nov. 16th.*—Strong SE. gale. 4 a.m. moderating a little. Soundings, 10 a.m., 24½ fathoms. Eskimo set several fox traps. They report no leads and no game.

6 p.m. Wind S. Temperature +23.

*Nov. 17th.*—9.30 a.m. Light S. wind. Dull and cloudy, Sounding, 50 fathoms. Soft mud. Lost dredge net; soon had it replaced with another. Cleared away the ice around stern of ship so as to make the water hole larger for sounding and dredging, especially to facilitate the dredge work. The dredge today at different times was filled with a great variety of sea fauna and flora, some of which was new to Murray. Eskimo trapped one white fox. It was very small. Hadley finished the second sledge. Calm and mild all through day. Lat. 6 p.m. 72°.59'—Long. 162°.7' W.

*Nov. 18th.*—Moderate NW. wind. Fine and clear.

9.30 a.m. Soundings, 48 fathoms, rock bottom. Dredge filled with round pebbles and nothing else.



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4 p.m. Latitude  $72^{\circ} 55'$ —Long.  $162^{\circ} 32'$ . Fresh NW. wind and snowdrift. Dull and cloudy. During the late afternoon, fine and clear. Brilliant moonlight. Temperature  $-9$ .

*Nov. 19th.*—Fine, clear and frosty. Wind light NW. Sounding, 10 a.m. 39 fathoms. Lost lead and tube of Kelvin machine. Fine day, no wind. Temperature—19.

11.30 a.m. Hauled dredge. In our sounding this morning we drifted over a place which was altogether blue mud. Now in the dredge, we get nothing but small, smooth round pebbles. Eskimo brought in three white foxes. Open water not near enough to do any seal hunting. We had three hours of good light today. Lat.  $72^{\circ} 52' 27''$ —Long.  $162^{\circ} 48' W$ . 4.30 p.m.

*Nov. 20th.*—Begins ESE. wind, and veering to East. Blowing moderate gale.

10 a.m. Sounding, 36 fathoms. Hauled dredge. Had a few specimens, also some small stones. During the last 24 hours we have been getting stones, some of which are very large, and then again some portions of the sea-bottom gives us quite a luxuriant growth of flora, also a large variety of fauna. Noon—blowing a gale, E. by S. Blinding snowdrift. Dredge doing remarkably well. Temperature—9. Lat. 4 p.m.,  $72^{\circ} 54'$ —Long.  $163^{\circ} 3' W$ .

*Nov. 21st.*—Blowing a whole gale, ENE. Blinding snowdrift.

10 a.m. Sounding, 36 fathoms. Dredge today secured an octopus. Stars shining very brightly. At 6 p.m., overcast sky. Lat.  $72^{\circ} 56'$ —Long.  $163^{\circ} 54' W$ . at 5 p.m.

*Nov. 22nd.*—Blowing a whole gale. I rather think the wind is stronger than yesterday. This incessant wind is devilish. Sounding 10 a.m., 32 fathoms. Wind, NE. by E. Murray told me he had gathered eleven new specimens of sea fauna yesterday. Finished building snow igloo over the dredge hole.

*Nov. 23rd.*—10 a.m. No let up in wind. Soundings,  $28\frac{1}{2}$  fathoms, 6 p.m. Wind moderating at last, and at midnight it is quite decent with the stars shining.

2 a.m. Lat.  $72^{\circ} 56'$ —Long.  $164^{\circ} 59' W$ .; 10 p.m.  $72^{\circ} 56' 30''$ —Long.  $165^{\circ} 26' W$ .

*Nov. 24th.*—Fine and clear, moderate N. wind.

10 a.m. Sounding, 26 fathoms, temperature—20. Mallock said he could read the transit at noon without artificial light. This, of course, is owing to the especially clear sky to the S. Today is a rare treat. Just before midnight a change again. Temp. going up. Sky overcast. Wind rising and veering to the W. Lat. 11 a.m.,  $72^{\circ} 53'$ , Long.  $165^{\circ} 38' W$ . 4 p.m. Lat.,  $72^{\circ} 54'$ —Long.  $165^{\circ} 45' W$ .

*Nov. 25th.*—Wind W., gale.

8 a.m. Hurricane.

9.30 a.m. Soundings, 26 fathoms. Eskimo finished banking up starboard side.

4 p.m. Lat. 72.15. Long. 165.30 W.

*Nov. 26th.*—During early hours, calm.

9.30 a.m. Soundings, 25 fathoms.

11 a.m. Gale, W by N. Dull and cloudy. Watersky to the N. Late in the afternoon, clearing overhead, wind moderating, still snowdrift on ice.

4 p.m. Lat.  $72^{\circ} 34'$ . Long.  $164^{\circ} 57' W$ .

*Nov. 27th.*—9.30 a.m.. Soundings, 24 fathoms. Light W. by N. wind. Fine and clear. Lat.  $72^{\circ} 26'$ . Long.  $164^{\circ} 50' W$ . Using dredge.

*Nov. 28th.*—Moderate N. wind. Fine and clear. Sounding,  $22\frac{1}{2}$  fathoms.

10 a.m. Lat.  $72^{\circ} 26'$ . Long.  $164^{\circ} 48' W$ .

*Nov. 29th.*—Moderate NE. wind. Rising temperature.

10 a.m. 25 fathoms. Afternoon wind blowing moderate gale. Lat.  $72^{\circ} 28'$  Long.  $165^{\circ} W$ . 9 p.m.



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*Nov. 30th.*—Moderate NE. gale. 10 a.m. Sounding, 24 fathoms. Miserable day.

*Dec. 1st.*—A whole gale. Wind, NE. Temperature—18.5  
Soundings 9.30 a.m., 22½ fathoms. Lat. at 5 a.m. 72° 30' Long. 165° 45' W. Lat. 10 p.m. 72° 26'—Long. 166° 13' W. Using dredge all day.

*Dec. 2nd.*—No let up in wind. 10 a.m. Sounding, 23 fathoms. 10.30 a.m. Lat. 72° 24'—Long. 166° 32' W. 8 p.m. Wind moderating.

*Dec. 3rd.*—Begins with wind moderating. 10 a.m. calm. Sounding, 23 fathoms. Afternoon—strong NE. wind. Fine and clear. Sent Eskimo hunting. Of course they cannot go far away as the twilight only lasts an hour or two. We put the clock to get all the working use we could of the light. That is, from breakfast to dinner, so that the men can see to work out of doors. The Engineer department has the engine apart, and giving the boiler a thorough overhauling. Ice pressure a short distance from the ship. We felt nothing of it on the ship. Lat. 72.20. Long. 167 W. 4 p.m.

*Dec. 4th.*—Fine and clear all through the day. Wind moderate NW. 10 a.m. Sounding, 22 fathoms. Temperature varies from —26 to —16 Lat. 72° 16'—Long. 167° 30' W. at 10 a.m.

*Dec. 5th.*—10 a.m. Fresh W. wind. Fine and clear. Sounding, 22 fathoms. Lat. 72° 10'—Long. 166° 48' W. Fresh to moderate W. wind all through day.

*Dec. 6th.*—10 a.m. Sounding, 23½ fathoms. Fine and clear. 10.30 a.m. Lat. 72° 6'—Long. 166° 46' W. moderate N. by W. wind.

*Dec. 7th.*—10 a.m. Wind light NNW. Soundings, 23 fathoms. 10.30 a.m. Lat. 72° 2'—Long. 167° W.

*Dec. 8th.*—Fine and clear. Moderate N. by E. wind. 10.30 a.m. Sounding 23 fathoms. Lat. 71° 54' 22"—Long. 167° 19' W.

*Dec. 9th.*—Light N. by W. wind. Fine and clear.

10.30 a.m. Sounding, 23½ fathoms. Afternoon, fresh NW. wind. Dull and cloudy.

*Dec. 10th.*—10 a.m. Sounding, 24 fathoms. Wind fresh N. by W. A little before noon a narrow ribbon of water showed itself on port quarter, about 200 yards away. Latter part of day overcast sky. Light WNW. wind. No alteration in newly opened lead. 8 p.m. Lat. 71° 43'—Long. 167° 15' W.

*Dec. 11th.*—Fresh W. by N. wind. Sky overcast. Had the Eskimo build a large snow igloo on the floe where we have the stores placed. Later on we can use it for either ourselves or for the dogs. Finished a third Peary sledge today. Soundings 11 a.m., 24 fathoms. Moderate wind. The lead of water has been opening and closing. No lateral movement, however. Late this evening it remained open. Lat. 71° 36' 9"; making wooden boxes to hold primus stove.

*Dec. 12th.*—Fresh NW. wind, sky overcast. Dull and cloudy.

10 a.m. Sounding 24 fathoms, wind fresh, NW. by W. Lat., 4 p.m., 71° 32'—Long. 166° 54' W.

*Dec. 13th.*—Fine and clear. Wind light NW. by W. Temperature —29. Sounding 10.30 a.m., 22 fathoms. Moderate NW. by W. wind. Fine and clear. Eskimo hunting, found no water. Lat., 10 a.m., 71° 27'—Long. 166° 54' W. This is the first continuous 24 hours of fine weather for many days. Ice rafting near ship.

*Dec. 14th.*—Fine and clear. Temperature —29.8.

10.30 a.m. Sounding 22½ fathoms. Light WNW. wind. Fine and clear. There has been a big pressure, some few hundred yards astern of ship, yet, we did not feel any of it on the ship. The pressure ridge runs NW. and SE. Lat. 71° 23' 25"—Long. 166° 57' W. Midnight, Lat. 71° 23'—Long. 166° 56' W.

*Dec. 15th.*—Fresh NW. by W. wind. Overcast sky.



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10 a.m. Sounding  $22\frac{1}{2}$  fathoms. During latter part of day fine and clear. Wind changing from NW. to S. Lat.  $71^{\circ} 22'$ —Long.  $166^{\circ} 52' W.$  at 9.30 p.m.

*Dec. 16th.*—Light NW. wind. Clear.

10 a.m. Sounding 22 fathoms. The Eskimo finished the dog-house near the ship. The walls were constructed of snow blocks. Had the sailors cover in the roof with boards and old sails, spreading ashes over the floor. Overhauled seal cache, and find that we have 41 seal left, giving each carcass an average of 40 lbs., it will aggregate to 1,640 lbs. That given to 25 people at a lb. a day will last us 67 days. We have seal meat on the table both in the dining room and forecastle once a day. We will, therefore, have plenty of fresh meat until the sun returns. Temperature —30.

*Dec. 17th.*—Begins fine and clear. Light NW. wind. Sounding 10 a.m., 23 fathoms. Dull and cloudy, light variable winds. Latter part moderate N. by E. Stars shining very brightly in heavens all through day. Lat.  $71^{\circ} 25'$ —Long.  $166^{\circ} 49' W.$

*Dec. 18th.*—Strong N. by E. wind. Sounding 10 a.m., 22 fathoms. Blowing a whole gale. Hard snowdrift. Fine and clear overhead. Bitterly cold. Lost dredge, the line parting a few fathoms below the surface; chief engineer making another. Day ends, no let up in wind. 4 p.m. Lat.  $71^{\circ} 26'$ .

*Dec. 19th.*—A whole gale NE. wind and snowdrift.

10 a.m. Sounding 23 fathoms. Noon, strong gale. Wind veering to the eastward. 5 p.m., a living gale. 9 p.m. Lat.  $71^{\circ} 35'$ —Long.  $167^{\circ} 48'$ . Midnight, no let up in wind which is now ENE. New dredge finished, and put down.

*Dec. 20th.*—Begins with a gale ENE. wind. Sounding, 10 a.m., 23 fathoms. End of day, weather conditions similar. Lat.  $71^{\circ} 42' 49''$ —Long.  $168^{\circ} 49' W.$

*Dec. 21st.*—A living gale, blinding snowdrift. Huge snowdrifts piled 30 to 60 ft. high around ship. Fine and clear overhead. The strong wind blew in the walls of the dog-house. Had Eskimo fix it up.

6 p.m. Lat.  $71^{\circ} 49'$ —Long.  $169^{\circ} 18'$ .

10 a.m. Sounding  $25\frac{1}{2}$  fathoms.

*Dec. 22nd.*—No let up in wind. 10 a.m. Sounding 26 fathoms. The barometer which has been unsteady for the last few hours has assumed the normal again. All hands employed clearing away the snow that has drifted around the ship. Lat.  $71^{\circ} 57'$ —Long.  $170^{\circ} 16' W.$  During afternoon wind moderating. Fine and clear.

*Dec. 23rd.*—Begins strong wind and squally. Soundings, 10.30 a.m., 28 fathoms. One of the dogs badly bitten in a fight. Required a good deal of sewing up. Am afraid dog will not live. Had it removed to a corner in carpenter shop, where it will receive good attention. Mr. Hadley undertaking the looking after of it. Had the Eskimo build a number of dog kennels, in one of the snow banks, so that we can put each dog by itself. A narrow lead of water made short distance from ship, but closed up. Squally all through day.

*Dec. 24th.*—Begins with a little lull in the storm. Intensely dark all through day. Blinding snow. Sounding, 10.30, a.m. 27 fathoms. Late in day wind moderating.

*Dec. 25th.*—Begins fine. Weather clearing. Calm, temperature —20.

9.30 a.m. Lat.  $72^{\circ} 4'$ —Long.  $172^{\circ} 48' W.$  Soundings 29 fathoms.

*Dec. 26th.*—Dull and cloudy. Fresh NNE. wind.

10 a.m. Sounding 27 fathoms. This morning a crack made from waist of ship toward the stern, and then running off starboard bow for about 100 yards. The crack did not open. A slight tremor was felt on ship. Toward close of day wind moderating. Lat., 5.30 p.m.,  $72^{\circ} 5'$ —Long.  $173^{\circ} 11' W.$

*Dec. 27th.*—Sounding, 10 a.m., 25 fathoms. The soundings do not agree with our position on chart. We are making every preparation to leave the ship if we have to. Men have been sewing and making sledging outfit. Engineers



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making oil tins, boiler for stoves, pick axes and everything that one requires for a sledge trip over Arctic ice. We can lay our hands upon things required at a moment's notice. 10.30 a.m., Lat.  $72^{\circ} 7'$ —Long.  $173^{\circ} 31'$  W.

*Dec. 28th.*—Wind moderate NE.

10 a.m. Soundings, 25 fathoms. Stars shining brightly. Wind moderate NE. Lat.  $72^{\circ} 8'$ —Long.  $173^{\circ} 48'$  W.

*Dec. 29th.*—Light NE. wind. Fine and clear. Sounding, 10 a.m.,  $23\frac{1}{2}$  fathoms. Lat., 10 a.m.,  $72^{\circ} 5'$ —Long.  $174^{\circ} 8'$  W. Can see a blue bank bearing S. by W. magnetic, which I feel sure to be land. According to our soundings it should be Wrangell island, but am rather inclined to think it is Herald. The light not being good enough to distinguish it plainly. Our observations would bring us to the north of Herald island. Of course, one cannot tell what error in our chronometers.

*Dec. 30th.*—Fine and clear. Moderate NNE. wind.

10 a.m. Sounding 26 fathoms. A crack broke today about one hundred yards from ship, remaining open for about 10 inches, and then closing. No lateral movement was noticed. Fine and clear all day. The land bearing S. by W. Lat.  $72^{\circ} 6'$ —Long.  $174^{\circ} 9'$  W.

*Dec. 31st.*—Fine and clear. Wind moderate NNE. Soundings, 10 a.m., 25 fathoms. Lat.  $72^{\circ} 5'$ —Long.  $174^{\circ} 5'$  W.

*January 1st, 1914.*—Fine and clear. Light N. wind.

10.30 a.m. Soundings,  $26\frac{1}{4}$  fathoms. Lat.  $72^{\circ} 5'$ —Long.  $174^{\circ} 8'$  W.

*Jan. 2nd.*—Fine and clear. Calm. Ship and ice stationary. Sounding, 10.30 a.m., 26 fathoms. Noon—dull and cloudy. A rumbling noise can be heard inside the ship similar to that which one often hears over telegraph and telephone wires. Evidently the ice is brought up on Wrangell island, and the running ice on our outside keeps pressing the ice that we are in firm on the island. Although near the ship, no indications of ice pressure, yet this rumbling booming noise indicates such to be the case. Lat.  $72^{\circ} 3'$ —Long.  $174^{\circ} 5'$  W.

*Jan. 3rd.*—Fine, clear and calm. Ship stationary.

Sounding, 10 a.m., 26 fathoms. Moderate N. Wind. The rumbling noise of yesterday still keeps up. The wind fresh N. with snow. All hands on ship fitted out with fur clothing.

*Jan. 4th.*—Sky overcast. Dull and cloudy. Wind light east. Sounding, 10 a.m., 26 fathoms. Lat.  $72^{\circ} 4'$ —Long.  $174^{\circ} 13'$  W.

*Jan. 5th.*—Wind NNE. light. Fine and clear.

Sounding, 10 a.m. 26 fathoms. During afternoon, cloudy. Light snow falling. Wind hauling to east. Midnight hurricane. Lat.  $72^{\circ} 4'$ —Long.  $174^{\circ} 12'$ .

*Jan. 6th.*—Wind still keeps up. ESE. Temperature  $+16$ . Very mild. Lat.  $72^{\circ} 10'$ —Long.  $174^{\circ} 33'$  W.

*Jan. 7th.*—Sounding 10 a.m., 27 fathoms. Dull and cloudy. Wind light ENE. Noon—sky clearing, getting colder as day wore on. Lat.  $72^{\circ} 11'$ —Long.  $174^{\circ} 36'$  at 6 p.m.

*Jan. 8th.*—Sounding 10 a.m.,  $25\frac{1}{2}$  fathoms. Dull and cloudy. Wind fresh ESE.

6 p.m. squally. Wind hauling to SSE.

*Jan. 9th.*—Begins clear, moderate SSE. wind.

10 a.m., soundings,  $25\frac{1}{2}$  fathoms.

4 pm.. Moderate SW. wind. Put up six boxes tabloid tea in tin cases, using 72 boxes for the 12 cases, a total of 14,400 tablets; also sewed with canvas 1,000 Mannlicker cartridges in 50 lot packages, and 1,000 twenty-two's in 250 package lots. These were put in hermetically sealed tins.

*Jan. 10th.*—5 a.m. Was awakened by a loud report as if a rifle had been shot off, and then a tremor all through the ship. Immediately I was on deck. The watchman and myself going overboard, walked to the bow and found a



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crack in the ice leading from the stem for about 200 yards in a NW. direction. Shortly afterwards the crack began to widen; the ship remained fast in the ice on port side. The sheet on starboard side began slowly moving astern. After widening for about 2 feet it stopped, but at different times during the day it kept moving astern, a little at a time.

Up until 7.30 p.m. the ship received no pressure, only slight shocks. The wind during earlier part of day was N. and light. During the afternoon it hauled to the NW. increasing in force, followed with blinding snowdrift. Began making preparations to leave ship should occasion arise. Had all the snow removed from deck, and the banking around skylights and outer walls of cabin to make ship lighter. Had the snow house on the floe fixed up all ready for persons to go in.

7.30 p.m. Blowing a gale NW. and blinding snow. The night intensely dark. The sheet of ice passing on starboard side lifted ship, heeling her to port when the point of this sheet on port side penetrated the planking and timbers in engine room, ripping off all the pump fixtures and putting the pumping out of commission. The chief engineer and myself were in the engine room, and seeing the water rushing in and knowing it was useless to make any attempts to rig temporary pumps I gave the order to abandon ship. The pressure was not at all heavy.

We soon had all the emergency supplies on the ice. Some ten thousand pounds of pemmican, furs, clothing, rifles and cartridges were thrown overboard. At 10.45 p.m. eleven feet of water in engine room. At this stage the ice kept the ship from going down; as the two points astern had broken and this gave the ice a chance to close more on the ship, and keep her up. All hands work well. I had sent the Eskimo woman and her two children to the big snow igloo, she having started a fire in the stove, and of course could keep the place warm. I kept the steward in the galley; and hot coffee and food on tap. When I saw that we had sufficient supplies overboard I told the men to get the sledges and haul the supplies to the solid floe, where our camp was. Midnight—men hauling the supplies to the floe, wind and weather still the same.

*Jan. 11th.*—2.30 a.m. Men finished sledging supplies to floe. In the snow igloo were the following men:—McKinley, Mamen, Williams, King, Chafe, Eskimo family, Beauchat, Murray, and Doctor.

In the box house: Munro, Williamson, Breddy, Hadley, Templeman, Maurer, Brady, Anderson, Barker, Mallock, and myself.

I told the men to all turn in and I would stay on the ship myself. Remaining there until she left me. My reason for not saving luxuries was that it was altogether useless, with biscuit, pemmican, and tea, for our sledging we could get along nicely. I had used the same things before for 120 days at a stretch, and found it ample. Another thing I did not want the men to take souvenirs or useless things. This all amongst 25 people would mean useless weight to carry on the sledges. Even tobacco was cut out, very little saved; and not an ounce left the camp to go with the men. I like tobacco just as well as any man, but I knew in the near future we would have to do without it, so it was just as well to begin right here.

3.15 p.m. Ship began to get lower in the water. At this stage the bow sprit and quarter held her for awhile.

4 p.m. With the blue ensign at the main topmast head, the *Karluk* disappeared, going down in 38 fathoms of water. Lat.  $72^{\circ} 8'$ —Long.  $173^{\circ} 50'$  W. approximately. 60 miles North by east of Herald island. After the ship sank, I turned in, sleeping in the box house. The weather began to clear up although still blowing very hard.

*Jan. 12th.*—Wind fresh W. by N. Snowdrift on ice; clear overhead. It must be remembered that we had not seen the sun as yet, the only light we could



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get being in the middle of the day from twilight. As soon as it was fairly light, I had all hands pick up odds and ends scattered round on ice. In the box igloo or house had a place for the galley, so that the cooking could be done, and the steward to himself. Also erected a tent. In the tent I had the following articles:—

70 suits jaeger underwear.  
 6 sweaters.  
 3 doz. wool shirts.  
 200 pairs stockings.  
 100 pairs mitts.  
 3 bolts of gabaderine.  
 6 fleece suits.  
 4 Burberry hunting suits.  
 2 large sacks deer legs.  
 2 large sacks waterskin boots.  
 100 pr. Mukluks.  
 100 fawn skins.  
 1 doz. hair sealskins.  
 2 ugruk skins.  
 20 reindeer skins.  
 6 large winter reindeer skins.  
 50 jaeger blankets.  
 20 mattresses.

On the floe was 4,056 lb. Underwood pemmican.

5,222 lb. Hudson Bay pemmican.  
 3 drums coal oil.  
 15 cases coal oil.  
 2 boxes tea.  
 200 tins milk.  
 250 lb. sugar.  
 2 boxes chocolate.  
 2 boxes butter.  
 1 box cocoa.  
 Candles and matches.

*Jan. 13th.*—Wind W. moderate breeze, fine and clear. Noon—sounding, 32 fathoms.

4 p.m. Lat.  $72^{\circ} 1'$ .

We saved one chronometer, but the abuse it received makes it worthless for time, hence the reason for no longitude. Land bore S. by W. All hands sewing fur clothing.

*Jan. 14th.*—Fine and clear. Wind W. Temperature—38. Soundings. 11 a.m., 34 fathoms. Land bore S. by W. half W. Men making foot bags. I told each man he was to have at least four pairs of deerskin or sheepskin stockings, and three pairs deerskin boots.

*Jan. 15th.*—Dull and cloudy. Wind N. Temperature—37. Land bore S. by W. Soundings, 38 fathoms. Lost one of our dogs, in a scrap last night. We can ill afford to lose our dogs as they are at a premium.

*Jan. 16th.*—Dull and cloudy. Fresh NE. wind. Overhauled primus stove. We have eight lovett pattern, and two Swedish. Before leaving the ship had them put in wooden boxes. Toward close of day wind NE. Soundings, 10 a.m.,  $37\frac{1}{2}$  fathoms. Men busy sewing. The Eskimo woman cutting out the clothes and the men sewing.

I decided today to send a party of four men to the land, ostensibly for game and definite information regarding drift wood, and to find out ice conditions. Also to blaze a road over the sea ice. I would rather have waited



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another week for the light would be better for travelling. I did not feel like taking the whole party to the land without supplies for at least four months. Further, the men have been living on the ship and were not inured to the cold and the privations that they would have to undergo. They were not also conversant with the ways of taking care of themselves in travelling over the Arctic ice during the small amount of light and during the low temperature that we for at least a month will have to contend with. I have noticed that our drift for the past week or so has been slow, and that by making a road or trail to the land it would enable us to get a good deal of supply on shore, and in doing this, the men would be able, from day to day, to get accustomed to the work, and travel; also as the days lengthened we could accomplish more. We could have permanent snow igloos built along the trail, and with a permanent camp on Wrangell island, and the big camp here, the men could dry out their foot gear; especially if plenty of drift wood was obtained at Wrangell, and sea-ice is altogether different from land travelling. On the sea-ice looking for a good road and building it consumes a lot of time. Once the road is made, especially from here to the island, I don't think we would have any trouble to keep it open, and by keeping up relays the faults in the road could be easily bridged. We are handicapped by the lack of dogs. Man power does not count very much on sea-ice; the dogs are the great thing for success. By adopting the relay system we can at least get enough supplies to land, to last us till the birds return, and the ice breaks up. McKinley, Mallock and Mamen doing all in their power to help and assist. In a day or two I am sending Mr. Anderson, Mr. Barker, sailors King and Breddy, to Wrangell island. Today McKinley overhauled the primus stoves; to find out how well they can behave. Also we want to know just how long a gallon of oil can last, and how many meals it can cook, and how much tea can be made in a given length of time. We found with great care, one Imperial gallon of oil can last 14 days, but I allowed one gallon for 10 days, a safe margin for tenderfeet.

Dull overcast sky. Noon weather clearing, land bore S. by W. Wind light north. Soundings, 37 fathoms.

*Jan. 18th.*—Begins moderate NE. wind. Strong gale. Blinding snow-drift. Packed three sledges. Those that could be spared I sent to make trail, so that the party going to the island could have a good start. Unfortunately the day was so bad that they had to return early to camp.

*Jan. 19th.*—Mr. Anderson, McKinley and myself, checked over the supplies on sledges. Wind moderate NNW. Land bears S. half W., hazy toward land. Soundings, 38 fathoms. Have all ready for tomorrow's start. Mamen and the two Eskimos go as the supporting party. They are to come back to Shipwreck camp when they have landed the mate's party on the island.

*Jan. 20th.*—Watchman called me at 4 a.m. Wind a gale, SW. Thick snow, and drift.

5 a.m. Called cook.

8 a.m. Had breakfast.

No change in weather. Party did not leave.

2 p.m. Weather clearing. Land bore S. half W. Wind light, S.W. Midnight, fine, clear and calm.

*Jan. 21st.*—5 a.m. Dull and cloudy. Wind light E.

9.30 a.m. Mr. Anderson, Mr. Barker, sailors King and Breddy, Mamen, and two Eskimos, left for Wrangell island. My orders to Mr. Anderson were:—

Shipwreck Camp,

Arctic Ocean, Jan. 20th, 1914.

You will leave tomorrow morning with Mamen, three sledges, 18 dogs, Mr. Barker, sailors King and Breddy, and the two Eskimos. The sledges are loaded with pemmican, biscuit, and oil. You will find list of articles on sledge attached



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to this. When you reach Berry Point, Wrangell island, you will be in charge of supplies. Kindly pay special attention to uses of them. The rations are:—

- 1 lb. pemmican;
- 1 lb. biscuits;
- with tea, per day;
- 1 gallon of oil will last ten days.

Mamen will leave one sledge, also the tent, taking back with him enough supplies to carry him to shipwreck. Whilst on the island, you will endeavour to find game. Be sure and bring it to your camp. Also collect all the driftwood you can find.

I also gave him verbal instructions about ice conditions, and in the event of open water to return to Shipwreck camp.

Sledge loads as follows:—

1st sledge:

- 4 cases of man pemmican,
- 1 tin H. B.,
- 10 gallons coal oil,
- 2,400 tea tablets,
- 1 tent and fly,
- 1 primus stove,
- 46 lb. biscuits.
- 500 .22 cartridges,
- 1 .22 rifle,
- Candles, matches, pick axes,
- 1 sledge cover.

2nd sledge:

- 25 lb. sugar,
- 4 cases dog pemmican,
- 7 tins H. B.,
- Two cases of biscuit,
- 1 doz. milk,
- 1 primus stove,
- 100 .30-30 cartridges,
- 1 .30-30 Winchester rifle,
- Candles, matches, pick axe, hatchets,
- 1 sledge cover.

3rd sledge:

- 4 cases of dog pemmican,
- 2 cases of man pemmican,
- 7 tins H. B.,
- 250 Mannlicker cartridges,
- 1 Mannlicker rifle,
- 1 gal. coal oil,
- 2 bottles alcohol,
- Pick axe, hatchets, shovels, rope, sleeping robes, and personal outfit,
- 1 pair skis,
- 1 pair snow-shoes,
- 1 sledge cover.

1.20 p.m. The men who went to assist the party returned. They had gone about five miles. Wind strong east with snowdrift.

10 p.m. Weather clearing. Wind light E. and mild.

10.30 p.m. Calm.



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*Jan. 22nd.*—Begins moderate SW. wind.

4 a.m. Light S. wind.

10 a.m. Fine. Wind light SW. Hazy to the south. Sent out Chafe and Williams with pemmican tins, the idea being to place the tins on high pinnacles as marks along the trail, more particularly where faults in ice occur. The tins are painted blue and red and form a striking picture against the white background. They can be seen for quite a long distance.

6 p.m. Sky overcast, wind NE. light.

*Jan. 23rd.*—Dull and cloudy. Moderate NE. wind. Air spring-like. Open leads of water to the south, about two miles distant. Made the box house larger, and a bit more comfortable.

*Jan. 24th.*—Fine and clear overhead. Hazy to the south. Wind NW. light. Overhauled Eskimo shack, making it more comfortable for the family. The men that were sent out to note alterations in trail, if any, returned late, reporting no change.

*Jan 25th.*—Fine and clear. Temperature  $-32^{\circ}$ . Land bore SSW.

4.15 p.m. Lat.  $71^{\circ} 57'$ . Sun came back to us today, being absent for 71 days.

*Jan. 26th.*—Fine and clear, except in direction of land. Probably open water to the south. Good deal of condensation in that direction. Temperature  $-24^{\circ}$ . It seems much colder. Set up two tents to see if they were all right for use later on. These two tents were made on the ship.

*Jan. 27th.*—Fine and clear. Can see the lower limb of the sun above the ice today. Land bore S. by W. seeing it quite distinctly. This is really the first good sight we have had of it. It is not Wrangell island. Wind E. Lat.  $71^{\circ} 59'$ .

*Jan. 28th.*—Fine, clear and frosty. Light NE. wind. Made two flies for tents. The men that were sent over the trail returned late reporting that there has been a little alteration in the trail, and that they could not find the trail again on the south side.

*Jan. 29th.*—Fine and clear. Sent Hadley with three men that were out yesterday. Hadley returned saying he had no difficulty in finding trail, and that it was good going. We made a big fire on the ice, using gasoline, coal, and a whale boat. The idea being should Mamen in coming out have trouble to find trail he may see the smoke and a little after night he could see the flames. I had told Mamen that an hour before dark, and an hour after dark on this day I would make a fire.

*Jan. 30th.*—Chafe, Williams, and Maurier, walked to second camp and then an hour and a half beyond that camp. When they turned they left a flag.

4.30 p.m. They arrived back to camp, and reported no changes in trail. Temperature today about zero. Fine and spring-like. The two engineers have been soldering and fixing up oil tins. The chief engineer using a sewing-machine. He can do it almost as good as a woman. Gave MacKay, Murray, and Beauchat, one Burberry suit each.

*Jan. 31st.*—Had Chafe, Williams, Maurier, Breddy, and Hadley, scouting over the trail today. They went to the third camp. and returned long after night. They could see the fire at Shipwreck four miles away. MacKay and Murray came to me this morning asking for supplies to go to the land. They want 50 days' supplies for four men, and are going to pull a sledge with manpower. I told them if they signed an agreement to absolve me from all blame later on and to cut themselves loose from our party, I would give them the supplies wanted, and further, told them if at any time they wanted to come back to camp they were perfectly welcome here. Also if they required assistance later on and it was possible I would render the assistance they would deem necessary. (Mr. G. J. Desbarats has a copy of the letter with supplies and signed by the four men.)



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*Feb. 1st.*—Dull, overcast sky. Wind light SW. Snowing. Fixed up floors of box house. Lat. Sunset by Saturn,  $72^{\circ} 3'$ .

*Feb. 2nd.*—Fine and clear. Light wind NE. Sailor Morris came to me asking for permission to go with the MacKay party, permission granted. McKinley getting supplies ready for Mackay party.

*Feb. 3rd.*—Fine and clear. A few narrow leads of water near Shipwreck camp.

8.30 a.m. Chafe and Williams left with Peary sledge, 4 dogs, and the following supplies:—

8 tins H. B. Pemmican,  
1 case dog Underwood Pemmican,  
2 cases of biscuits,  
1 case coal oil.

Beside food for themselves and dogs for 7 days, and camping outfit.

These supplies are to be left at the fourth camp. They also carry several flags which are to be placed at conspicuous points, especially on the high rafter near any faults.

4 p.m. Mamen and the two Eskimos came in. Mamen reports that he did not reach Wrangell island, but on Jan. 31st, eleven marches from Shipwreck camp, they were stopped by open water, three miles from Herald island. The mate decided he would land on the island when a chance would offer. Mamen stayed with them for a day, then left for Shipwreck. Up to the time Mamen left, there was no chance to land upon the island, and he, Mamen, did not think that they could land there. Herald island is no place for a party to land upon. It is inaccessible, and further, no driftwood on its shores, owing to the precipitous cliffs, all around the island. It is only three and a half miles long, half a mile wide, twelve hundred feet high. Mamen left the party on the 1st of Feb.

*Feb. 4th.*—Moderate east wind. Air filled with condensation. Temperature —27. Mamen and his party drying out clothes. Hadley and Williams, making dog harness. Just as soon as Mamen's clothes are dried out, he is going back to the island, and locate the mate. Murray came, informing me that they were leaving tomorrow morning.

*Feb. 5th.*—Fine, clear and calm. Chafe and Williams came in, having landed their loads safely at No. 4 Camp. Mackay, Murray, Beauchat, sailor Morris, left this morning. They are to be sent later on up the trail.

*Feb. 6th.*—Overcast sky. Loaded four sledges for tomorrow's journey. Wind light NNW.

*Feb. 7th.*—4 a.m. Called cook. Breakfast 5.30 a.m.

6.15 a.m. Chafe and Williams with first sledge load consisting of one case dog pemmican, five tins H. B. Pemmican, 1 case oil, 1 case of man pemmican, beside 7 days' food supplies for themselves and dogs, and camping outfit.—These supplies are to be left at the fifth camp.

7 a.m. Mamen and two Eskimos got away with three sledges and 17 dogs. The following supplies on the three sledges:

4 cases Man Pemmican.  
3 “ dog “  
3 “ oil,  
10 “ biscuits,  
16 tins H. B.

Mamen was to go to the island and locate mate's party; if the mate was still there, he was to leave all the supplies with him and come right back to Shipwreck camp. If he did not find the mate, who would no doubt have gone to Wrangell island, he was to leave the supplies along the trail. I presumed



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that should he not find the mate that he had gone on to Wrangell. My plan was to get all the supplies as near to the land as possible, at the same time endeavouring to keep the trail open.

About 2 p.m. Mamen came back, having dislocated his knee-cap. Chafe now took over the leadership of the party, going on with the two Eskimos. Williams, who was with Chafe, had fallen in the water. He came back with Mamen. I then sent Mr. Munro and Williams, who had changed his clothes, to overtake Chafe, but owing to darkness and a lead of open water, they did not catch up with him. If they did not catch up with Chafe they were to carry Chafe's load to 5th camp, and return.

*Feb. 8th.*—Dull with overcast sky. Wind moderate North. Mamen has a lot of trouble to get knee-cap in place. Williamson is attending to it, giving it his special attention. We have at Shipwreck, up to date 5,000 lb. of Pemmican left. We use no pemmican when in camp. We have lots of seal meat and other things.

*Feb. 9th.*—Fine and clear. Light N. wind. Thermometer —40.

12.40 p.m. Mr. Munro and Williams came in. Met open water between second and third camp. Next day they had trouble again with open water. Reaching fourth camp and shortly afterwards, the ice closed, so that they could go on again. At the fifth camp they could not find a good place to build a cache, so they returned to No. 4, which is a very fine place, and here they put off their load. Land today bore south. We are slowly moving to the west.

*Feb. 10th.*—Fine and clear. Wind moderate NE. Mamen's knee-cap in place, have it bandaged. Williamson looking after it. Men drying out clothes and repairing harness and sledges.

*Feb. 11th.*—Begins fair and clear. Wind moderate NNE.

4.15 a.m. Called cook.

5.30 a.m. Mallock and Munro with four dogs, the Peary sledge, and seven cases of dog Pemmican, and food for seven days with camping outfit, left for the 4th igloo, but if the travelling beyond the 5th igloo was good, they were to leave the Pemmican at the best place beyond the 5th camp. Temperature —38. Fine and clear.

*Feb. 12th.*—Dull and cloudy. Wind fresh NE. Latter part of day, wind strong east. Chronometer stopped.

*Feb. 13th.*—Fresh east wind. Dull and cloudy. Sunset fine and clear.

*Feb. 14th.*—Fine, clear and calm. Land appeared very high and today we could see Wrangell island. Mallock and Munro came in at noon. In crossing a lead of young ice, the sledge broke through; they had to cut the dogs from the sledge, also the pemmican. All their sleeping gear was saturated with water; their tent as well. It will take them two or three days to dry out and I feel very happy of their lucky escape. It is a lucky chance for them Shipwreck camp is so near.

*Feb. 15th.*—Fine and clear. Light N. wind. Repairing harness, also making a complete new set. Sent Maurier and Breddy with six cases of dog pemmican, and one case of man pemmican to the 4th igloo.

*Feb. 16th.*—Dull and cloudy. Wind NE.

4 p.m. Chafe and the two Eskimos came in. Chafe reports that he did not get nearer than three miles of Herald island, and stayed round for two days, and kept a good look-out with binoculars, but could not see any person or tent on the island. I presume the mate had gone to Wrangell island. The Eskimo in Chafe's party, shot four seal, and saw three walrus; coming back they had difficulty in finding the trail, and near the island were adrift on single pieces of ice. On the way back, when about twenty miles from Herald island, they passed the MacKay party. The sledge was drawn by Murray, McKay and Morris. Beauchat was some distance astern with feet and hands



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frozen, and from Chafe's report in a bad way. Sailor Morris had blood poison in his left hand. They appeared also to be in bad shape. Chafe offered assistance; they refused and said they were bound for Wrangell island. They, however, accepted some seal meat that Chafe had. Chafe left all supplies at the 6th camp, with the exception of enough to bring him to Shipwreck. On this trip, they lost one dog, also a sledge was broken and left behind. Maurier and Breddy came in about the same time, having left their load safely at No. 4 camp.

*Feb. 17th.*—Blowing a gale NE. all day.

Men drying out clothes. Getting two parties ready for Wrangell island.

*Feb. 18th.*—Fresh NE. wind. Fine overhead, but drift on ice. The last day or two we have moved to the west. Herald island this a.m. bearing SE. by S. half S. The Hadley, Munro party, ready for tomorrow.

*Feb. 19th.*—Called cook 4 a.m. Two sledge parties leaving for Wrangell island. In the first sledge party are Mallock, Hadley, Williamson, and Breddy. In the second, Munro, Maurier, Williams, and Chafe. They take four dogs to each sledge, and of course man-harness for themselves. On Mallock's sledge are the following supplies:—

- 6 cases of man pemmican.
- 2 cases of biscuit,
- 2 gal. oil,
- 84 tins milk,
- 2,400 tea tablets in hermetically sealed tins.
- 1 Mannlicker rifle,
- 250 rounds ammunition,
- 1 Ross revolver (Mallock's own),
- 400 rounds ammunition,
- 1 primus stove,
- Matches, pick axe, hatchets, tent, sleeping robes.
- 1 gal. alcohol,
- 500 .22 cartridges,
- 1 .401 Winchester,
- 100 rounds ammunition,
- 1 pair skis.

Munro sledge:—

- 5 cases man pemmican,
- 2 cases biscuit,
- 84 tins milk,
- 2 gals. oil,
- 1 gal. alcohol,
- 2,400 tea tablets in hermetically sealed tins,
- 1 primus stove,
- Matches, pick-axe, hatchets, tent, sleeping robes,
- 1 Mannlicker rifle,
- 250 rounds ammunition,
- 1 pair snow-shoes,
- Snow knives, candles, and tracing of map, Wrangell island.

They are to pick up more supplies which have been cached along the trail, the idea being to keep full loads all the time, and in this way keep moving supplies further in shore. Gave each man one new suit jaeger underwear.

*Feb. 20th.*—Blowing a gale, snowdrift. Wind E. Kuralik's back troubling him a good deal. I was going to leave today with the remaining party, but will remain till the Eskimo is all right. We have two lame dogs, and this will give them a chance to recuperate. One of them has a bad tear in its leg. Put nine stitches in it yesterday.



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*Feb. 21st.*—No let up in wind. Eskimo's back no better. In any case the weather is too bad for travel, and it is better under the circumstances to be eating our supplies at the camp, than further along the trail. The two dogs are also improving.

*Feb. 22nd.*—No let up in wind. Eskimo fitting up harpoon and spears. We still have several seal left. We are giving the dogs seal meat, in fact, whilst the dogs are at the camp they get all the seal meat and pemmican that they can eat, for we have plenty of pemmican.

*Feb. 23rd.*—Storm breaking. Huge banks of snow accumulated around the camp, in fact, we are all snowed in. I had two of the crippled dogs in our igloo, the others in the big igloo that had been occupied by the party who have gone into the island. It took us nearly all day to dig our way to where the dogs are.

*Feb. 24th.*—4 a.m. Began loading sledges; with the Eskimo Kuralik are his wife and two children. The baby was carried on the mother's back from the camp to Wrangell. The little girl, ten years old, walking. Templeman goes with them.

The following supplies on Kuralik's sledge:—

- 4 cases man pemmican,
- 48 tins milk,
- 2 tins biscuit,
- 1 case oil,
- 2,400 tea tablets in hermetically sealed tins,
- 1·30-30 Winchester rifle,
- 200 rounds ammunition,
- 1 tent,
- 1 primus stove,
- 1 axe, two pick-axes, candles,
- 1 gal. alcohol,
- Matches, snow-knives, and sleeping robes.

His sledge was drawn by five dogs.

Katktakovik's sledge drawn by three dogs, had the following supplies:—

- 3 cases man pemmican,
- 36 tins milk,
- 2 cases biscuit,
- 10 gals. oil,
- 2,400 tea tablets.

My own sledge, drawn by four dogs, had the following supplies:—

- 4 cases man pemmican,
- 2 cases biscuit,
- 36 tins milk,
- 12 tins coal oil,
- 2,400 tea tablets,
- 1 tent, matches, primus stove,
- 1 axe, two pick-axes, candles, matches, snow-knives,
- 1 gal. alcohol,
- 1 pair snow-shoes,
- 1 pair skis,
- 1 Mannlicker,
- 250 cartridges,
- 1 Colt revolver,
- 100 rounds ammunition,
- Rope, and spare harness, sleeping robes.

In my own party were: McKinley, Mamen, Kataktektovik.

Mamen was nursing a dislocated knee-cap, and of course, could not assist in pulling the sledge. McKinley helped me with my sledge.



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We got away just before noon, and left the British ensign flying over the camp. Two transits about 3,000 lbs., pemmican, 80 cases biscuit, 200 sacks coal, 10 cases of gasoline, 2 drums coal oil, and odds and ends were left behind. At nightfall, we pitched the tent a little beyond second camp. We intended to build an igloo, but it was so dark, and we were so tired that we did not do it. Spent a miserable night under canvas.

*Feb. 25th.*—At dawning broke camp. Wind NE. light. Fine and clear. 4th camp found note from Munro saying they had shot a bear and were held up by bad weather, also the trail beyond here was badly smashed, and some of the supplies could not be located.

4.15 p.m. Caught up with Kuralik. Owing to our oil that we were to get having been destroyed by the ice running over the cache, I decided to send McKinley and Kataktekovik tomorrow back to Shipwreck for oil. We now built an igloo, and whilst building the igloo I tried to locate the trail which had been destroyed in the previous storm. In some places I could pick it up. Returned back to camp at dark.

*Feb. 26th.*—McKinley, with Eskimo, one sledge, and all the dogs, left this morning at dawning for Shipwreck. During the night ice broke through the centre Eskimo igloo, fortunately they got out in time. We had in our igloo the same trouble. All hands up all night. Today with Eskimo did some scouting, could not locate any of the caches. From here on we can follow the trail made by the Munro party. The big storm has sent the ice well to the west, and today Herald Island bears ESE., Wrangell SSW.

*Feb. 27th.*—Ice rafting all night. Wind N. by W. Eskimo family had to build another igloo. The one we are in still standing. At times we were all afloat. This afternoon in the distance we saw two men, belonging to the Munro party.

3.30 p.m. McKinley came back from Shipwreck, 15 gals. oil, two tins alcohol, 6,000 tea tablets, some fawn skins, and twelve seal skins.

*Feb. 28th.*—Daylight. With the two Eskimos broke camp; going over the trail made by the Munro party. Will leave behind at this cache two cases biscuit, and some alcohol.

1 p.m. Came up with Munro and the Mallock party. A huge rafter from 25 to 100 ft. high and about 3 miles wide barred further progress toward the land. The last storm has caused all this trouble, and there is no way to get around this, as it runs parallel with the island.

3 p.m. I told all hands to start in and build their igloos, and tomorrow with pick-axes we will begin to make a road through this rafter. Whilst they were building the igloo I made reconnaissance of the ice, returning to camp at dark.

*March 1st.*—Daylight sent back Chafe and Mamen for biscuit, that was left at the cache. All the others with pick axes began making road through rafter. Mallock and Maurier frozen feet. Wind NNW. cloudy. Late this afternoon Chafe and Mamen returned with biscuit.

*March 2nd.*—Daylight McKinley, Hadley, and Chafe left for shipwreck camp, taking 14 dogs, and one sledge. They are to get another sledge from Shipwreck, and to bring up full loads to us here. The remainder of the crowd working at road through rafter.

3 p.m. Through the big rafter and on to a small level floe. One of the men in going back to our camp lost himself, but fortunately we located him before dark. Sky overcast, light N. wind.

*March 3rd.*—Daylight, Munro and myself with two teams working supplies through rafter; sent the others to work through small rafter beyond the small level floe. We made three trips during the day, through the rafter. In the after-



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noon sent two Eskimos toward land, they returned with report of better traveling when we get through the rafter, that we have been working at today. Fine, hazy toward the land.

*March 4th.*—Shifted camp to the S. side of rafter. Mamen, Eskimo, and myself, moving camp. The others working with pick-axe. About 4 o'clock finished working through the rafter, so we all went back to camp, and at 8 p.m. had supplies moved to the new camps on the south side of rafter. The two Eskimos building the three igloos. Wind NW. Sky overcast.

*March 5th.*—Daylight. Sent Munro and crowd to meet McKinley party. I went with the Eskimo toward the island, and laid out track for tomorrow. Long after dark Munro party returned. Did not meet the McKinley party.

*March 6th.*—Daylight, sent the others back to meet McKinley party. I went with the two Eskimos and the two Peary sledges and dogs, light loads, to a distance of about seven miles, where we threw off the loads, finding a large floe which would later on make a good camping ground. McKinley and party reached camp 4.30 p.m., having shot three bear on the road in. They brought the following supplies:

- 6 cases dog pemmican;
- 16 tins H. B. pemmican;
- 30 gals. gasoline;
- Hatchets and snow knives.

They left at No. 1 cache, 4 cases dog pemmican, ten tins H. B. pemmican.

*March 7th.*—McKinley, Hadley and Mamen, went back for bear meat, the rest of the crowd ahead making trail, and working up supplies. Fine and clear. No wind. Temperature low. We have no thermometer, but the coal oil is quite thick, which shows that it is pretty cold. We welcome this cold weather for it means fine travelling weather.

*March 8th.*—Daylight, broke camp. All hands moving supplies to the big floe about seven miles away. Arriving here three of us went back for second load, leaving the others to build igloos. Fine, clear and calm all day.

*March 9th.*—Dawning, left with one Eskimo to blaze trail, leaving the others to move along supplies. For a while we had a good deal of picking, later a little better. Stone dark we all returned to camp of yesterday, having moved all our supplies ten miles along the trail. Two bears destroyed one case coal oil, and scattered two tins biscuits round the ice. The oil was all wasted, and a good deal of the biscuits were recovered, so it's not only the elements one has to contend with, but the polar bear as well.

*March 10th.*—Daylight, sent all hands with light load through bad piece of going. When that was negotiated they returned and took another load to the same piece of rough going. On getting through, built igloos; leaving the Eskimo to build the igloos, all hands returned and brought up balance of supplies. We now have all the supplies at this camp. Fine, clear, calm and frosty. Splendid working weather.

*March 11th.*—All hands working moving along supplies.

*March 12th.*—Dawning, left with two Eskimos and light loads. The others coming after.

1 p.m. Landed at ice spit, Wrangell Island. Found lots of driftwood. Later on in the evening the balance of the party turned up. Here we built three igloos; a beautiful day.

*March 13th.*—Munro, Chafe, Breddy, and Williams, with all the dogs and the sledges went back to fetch up the supplies. They made two loads to the spit, finishing at dark. We now have all supplies on the land. Sent Kurallik for a scout in a NW. direction along the island, to see if the mate's party or the MacKay party had landed. Also to find out if any new bear tracks along the



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coast. He saw nothing of the other parties, and reported seeing nothing alive in the shape of game.

*March 14th.*—We are all drying out our foot gear. We can do this readily because we have plenty of fuel. I sent the Eskimo for a scout on the land, thinking there may possibly be reindeer. He returned late in the afternoon saying he had seen nothing, and that owing to there being so much snow on the land that cariboo were not on the island. He saw no fox tracks, nor hare tracks. He thought later on that it would be a good place for ptarmigan. Wind fresh SE.

*March 15th.*—Blowing a gale ESE. and snowdrift. We are all drying out our clothes. Mamen's leg bothers him a good deal today.

*March 16th.*—4 a.m. Light NW. wind, cloudy.

8 a.m. Blowing a gale.

Munro, Breddy, and Williams were to start back to Shipwreck for more supplies. The weather being too bad they gave it up. Mamen's leg causing him a good deal of suffering.

*March 17th.*—Light NW. wind.

8 a.m. Munro, Breddy, and Williams, with one sledge and 16 dogs, left for Shipwreck. I intend to-morrow to leave with Eskimo for the Siberian coast, and thence to journey eastward to the East Cape, and then get in touch with the Naval Service at Ottawa, leaving the men on the island. McKinley and I getting together supplies and equipment for my journey. Had the Eskimo build an igloo, and late this afternoon McKinley, Mamen, with the Eskimo and myself moved in.

*March 18th.*—8 a.m. Wind NW. Snowdrift. Before leaving I left instructions with McKinley for Mr. Munro. Mr. Munro, the chief engineer, is in charge during my absence. I also had McKinley go over with me a list of the supplies left on the island. My instructions to Mr. Munro and the list of supplies left on the island are in possession of the Deputy Minister, Mr. G. J. Desbarats.

Before leaving, I told the men to write a short note to their friends, which was done. I am taking with me the Peary sledge, seven dogs, and the Eskimo boy, Kataktekovik. Shortly after leaving strong NW. wind and snowdrift. We followed the coast to the SE. and keeping a sharp look-out for any traces of the mate's party and the MacKay party.

6.30 p.m. Built an igloo near Skeleton island.

*March 19th.*—8 a.m. Gale NW. wind, and blinding snowdrift. Broke camp and followed the shore.

11 a.m. Passed Hooper cairn.

5.30 p.m. Built igloo. Fine and clear. The dogs pulling fairly good. The going all that one could desire. I notice after rounding Bruit spit and then following the south coast of the island little or no driftwood.

*March 20th.*—7 a.m. Strong NW. wind. Blinding snowdrift. It was my intention of now going out on the sea-ice, and making a bee-line across long Strait for Cape North on the Siberian coast, a distance of 160 miles. I found, however, that the ice was piled up at this place that it would take me days to work my way through. The snow was also very deep and soft. I now followed the shore crossing over the Rodgers Harbour spit in to Rodgers harbour to see if the mate's or the MacKay party were there. I then followed the coast westward to Hunt point. Dark—built igloo.

*March 21st.*—Dawning, broke camp, wind fresh east, snowdrift. Sometimes followed the shore, and then again on the ice close to the shore. Traveling on the land being bad, owing to the high winds blowing the snow on to the ice, whilst on the ice we had the deep soft snow to contend with. Dark, built igloo.



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*Mar. 22nd.*—Dawning, broke camp. Made another effort to get on the sea-ice. Deep soft snow and heavy rafters blocked the way. In returning back to the land, broke the sledge, which necessitated a couple of hours delay to repair. On getting back to the land, we found better going, and then again getting on the ice near the shore, the going improved. We followed the shore to the Blossom point. It has been foggy all day, and the poor light bothers us a good deal.

*Mar. 23rd.*—Broke camp at dawning. Shortly after leaving broke our sledge, but soon had it repaired. While the Eskimo was repairing the sledge, I went ahead with the pick-axe. We are now making a road from Blossom point to the running ice, the distance being about five miles. Wind fresh W. Overcast sky. The poor light bothers us a good deal and makes the finding of a good road very hard indeed. Late this afternoon we reached the edge of the still ice and spent two hours making a road through the edge of the rafter. This evening we built the igloo on the still ice. Tomorrow will see us on the running ice.

*Mar. 24th.*—Dawning broke camp. Worked our way through the rough going in the rafter and let ourselves onto the running ice. Owing to strong gale west wind and open water, we have a good deal of condensation. A good deal of criss-cross travelling was done today. The road to the south being blocked by open water. We saw a seal in an open lead, but at the time our attention was taken up in trying to get our sledge off thin ice, so we did not bother with an attempt to secure it.

*Mar. 25th.*—Dawning, a howling gale from the west, and blinding snow-drift. The young ice and open water necessitates our going at right angles to a true south course. Several times the sledge has broken through, and the dogs evidently do not appreciate the water, and are very much frightened. Unfortunately, our sleeping gear wet. We saw bear tracks.

5 o'clock built igloo. Although we have been hard at it all day, I don't think the distance made good will exceed four miles.

*Mar. 26th.*—Dawning, fine, wind light east. Shortly after leaving, shot seal. Had a good deal of trouble getting it. But with a line attached to a weight the Eskimo managed to lasso it. Crossed a wide lead young ice, then on to a large rough heavy old floe, using a pick-axe. Later wind blowing a living gale from the east. Open water. Air thick, condensation, bad light, built igloo. Distance made good about five miles.

*Mar. 27th.*—Shortly after midnight wind hauled to the west, blowing a gale. It unroofed the igloo, resulting in our getting a good snow-bath. We had to turn out and fix it. Dawning we left. It is just as well to be on the road as in the igloo, although the weather is beastly. One of the dogs broke his trace and got away. Shortly afterwards secured it.

10 a.m. Stopped by a big open lead of water running east and west. We travelled two hours to the eastward, and found a large piece of ice, which had broken off. On this we placed the sledge and dogs and ferried across to the opposite shore.

*March 28th.*—7 a.m. Broke camp. Miserable light for travelling. Got our sledge and ourselves in water. Fortunately the two of us managed to get out without getting very wet, and saving the sledge before it disappeared. All our clothes and sleeping robes more or less saturated with water. Late this afternoon. Wind moderating. Nice and clear. Also spring-like.

6 p.m. Built igloo. Camped for the first time on an old floe, and could make tea from ice. Before this, we had to use snow.

*Mar. 29th.*—Shot a bear near camp this morning.



6 GEORGE V, A. 1916

7 a.m. Finally got away from camp and was soon held up by open water. We followed the edge until noon in a SE. to ESE. direction. Shot one seal, saw several more. Crossed the lead, noon. Dark, built igloo. I think we have made ten miles good today. Wind fresh.

*Mar. 30th.*—The first fine day for a long time.

6 a.m. Broke camp. Encountering leads of open water all day. On young ice for some time without getting to the opposite shore. Another lead we had to make four trips to get across. Wind south to east. Just before sunset saw land, bearing SW.

*Mar. 31st.*—Fine and clear. Wind light east. Shortly after leaving strong wind. Better luck negotiating leads. Noon a narrow lead which ran a long distance at right angles to our course we could not cross. Sledged for two hours along edge to the east. At last the distance was small enough to admit of us unloading our sledge and throwing the things we had on the sledge the other side. Our dogs are playing out, and three of them are very sick. This evening can see land quite distinctly.

*April 1st.*—Wind east. Waiting for dawn to get under way. For two hours good going.

11 a.m. Leads open water gave us some trouble. Later on heavy ice. Using pick-axe.

4 p.m. Strong wind. Dark, built igloo. Dogs very tired.

*April 2nd and 3rd.*—Dawning got away. Encountered open water. At last we struck some good going, and then some old floes and rafters. Dark, camped near land. Midnight the ice split right through the igloo, opening for about two feet. Up all night. Daylight calm. Ice moving in all directions. Very bad light, which worries us a good deal. Dogs very poor.

6 p.m. Built igloo. Our eyes bother us.

*April 4th.*—6 a.m. Eskimo and myself started in using the pick-axe to make road. A very nice morning.

10 a.m. Went back, hitched up the dogs, bringing them over the trail. Whilst I went back, Eskimo kept working with pick-axe. 4 p.m. We reach the end of the rough ice and on to a level floe which brings us to the Tundra of the Siberian shore.

*April 5th.*—I did not exactly know our position on landing. Later on I found we had landed some sixty miles west of North cape. Dawning we went back over the trail of yesterday, and picked up some things that we had left. The light was awful, and although we had yesterday's trail to go over, at times we could hardly locate it.

9 a.m. Returned to igloo on shore with balance of things.

10 a.m. We left following the Tundra to the east. Thick snow so we cannot see far.

1 p.m. Reach three Eskimo igloos and were made comfortable.

*April 6th.*—Spent all day in the igloo drying out our clothes. We had some deer meat. Of course, these people have no flour or biscuit.

*April 7th.*—10 a.m. Left the igloo. An Eskimo with one dog and a sledge going with us as far as the North Cape. Fine and clear. Our dogs can just move along. Two of them are almost dead. Dark—built igloo. Two dogs perished today.

*April 8th.*—Dawning, left igloo following edge of Tundra. The Eskimo loaned me his dog. Dark, reached Cape North. Here I met two Russian traders. One can speak a little English. I spent the night with some Eskimos and was very comfortable.

*April 9th.*—Dawning, strong wind and drift.

10 a.m. Clearing, still blowing hard. We got away from the igloo. They gave us one dog. We have now five. Dark, built igloo.



## SESSIONAL PAPER No. 38

*April 10th.*—8 a.m. Broke camp. Bright sunshine. Light east wind. Eskimo complains of his hands and feet. I suffer a good deal of pain in my arms. Noon—came to two igloos. Here I traded a Colt revolver and some cartridges for a dog. Two of our dogs lay down. One perished, the other one I carried on the sledge. Left this igloo at two p.m., reached two more igloos, where a man told me I could have a dog on condition that I would send him two hundred Remington cartridges by a trader some time next summer. Here we got some dog meat also.

*April 11th.*—Broke camp, but found two of the dogs had eaten their harness, and went back to the place where they belonged. Sent Eskimo back with a sledge to locate dog. He turned up some hours afterwards with the man who had traded the dog with me for the Colt revolver. The other dog he did not see. We went on with that dog, and at dark we built an igloo. We brought one of the dogs in the igloo with us, thinking he was secure.

*April 12th.*—The dog got away from us during the night, chewed his harness and burrowed his way through the igloo. The distance was too great to go back and look for it.

6 a.m. Broke camp, and at dark we built our igloo. Good going all day.

*April 13th.*—5 a.m. Broke camp, and toward evening spoke to an Eskimo picking up driftwood. Later on he overtook us, and gave us a lift. Sunset built igloo, the Eskimo coming in with us. Shortly afterwards, three large teams of dogs came along, and to my surprise and joy they brought the dog that had strayed away from us. It was the dog that I traded the Colt revolver for, and the man knew of our predicament and sent the dog back by these men.

*April 14th.*—Wind a gale, west. The other Eskimo getting away before we did. They said that our dogs were very slow, and it was no use for them to wait. I wanted to trade a rifle, but I had no cartridges, so of course I could not get the dogs. Long after dark, we reached an igloo with three people in it, and here we spent the night.

*April 15th.*—6 a.m. Left igloo. Beautiful morning. Good going. 5 p.m. Reached Cape Wankarim. I am almost blind.

*April 16th.*—Dawning, left Wankarim. The man who owned the igloo we slept in last night said he would come to two igloos about ten miles away, giving us a lift with his team. Dark. That night reached a solitary igloo inhabited by two very old people, who were very hard up for food.

*April 17th.*—Just before dawn got away from the igloo, and late tonight made Eoliuchan Island. From the time we left the igloo this morning, until dark, we did not see a thing along the trail, owing to the thick weather, and were right on the island before we saw it.

*April 18th.*—Forced to give ourselves a rest, and dry out our foot gear. I gave ten dollars to a fellow for a dog. The dog was not of much use, but better than nothing. People treated us very kindly.

*April 19th.*—8 a.m. Got away from the Island. An old man with a team going to Koliuchan gave us a lift.

*April 20th.*—Late in the afternoon reached a trader's place at Koliuchan. Here I obtained some flour and a little bacon. The first we had had for some time.

*April 21st.*—After a good long sleep pulled out with two teams I secured from Olsen. Late in the afternoon we put up at an igloo.

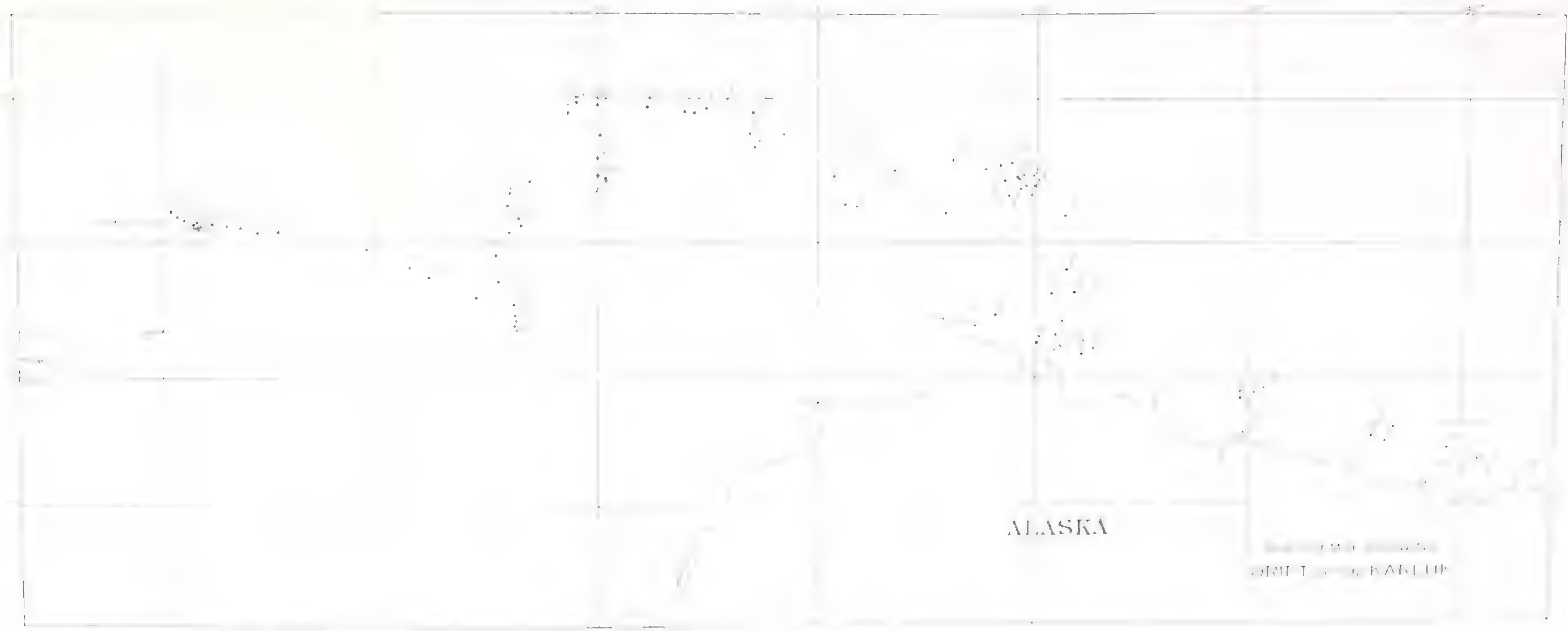
*April 22nd.*—Little after midnight we got away from the igloo, and at 3 p.m. reached Cape Serdge. Here I met Mr. Wall who was very kind. I secured a team from Mr. Wall for myself and another one for the Eskimo, and on April 24 reached East cape, where I put up with a Russian trader, Mr. Caraifaff. On May 16 I reached Emma harbour. Baron Kleist, the supervisor of the



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North-east Peninsula of Siberia, accompanying me from the East Cape to his home at Emma harbour. He extended to me the hospitality of his home. His doctor treated my legs so that I could in a few days be my own self again. Whilst here we heard that a steam-whaler was in the vicinity, and later found out that it was the *Herman*, Captain Peterson. I sent several letters in the hope of intercepting the *Herman* and on the 21st May the *Herman* arrived at Emma harbour. Capt. Peterson kindly offered to land me either at Nome or St. Michael. Arriving off Nome owing to ice he could not get in to shore, but landed me at St. Michael, Alaska, Thursday evening, 7 o'clock, May 28. The next day I sent a telegram to Mr. G. J. Desbarats, Naval Service, Ottawa, apprising him of the loss of the *Karluk*, and my return to St. Michael. Stayed in St. Michael until end of June, and in July, reached Nome, and on the evening of July 23, joined U.S.R.C. *Bear* at Nome, the Naval Service securing her assistance to go and rescue the men on Wrangell island. On the evening of Aug. 25 we were about ten or fifteen miles from Wrangell island. Thick weather and the *Bear* having run short of coal, her Captain decided to go back and secure coal at Nome. On Sept. 8, at 1,30 p.m. when about 75 miles south of Rodgers harbour, Wrangell island, came up with the *King and Wing*, with Munro, Williamson, McKinley, Chafe, Williams, Templeman, Hadley, Maurier, on board, Mallock, Mamen and Breddy having died on the island. The survivors were transferred to the *Bear*. The *Bear* then proceeded to Herald Island; on the morning of Sept. 9 we were about 12 miles from the Island with no chance owing to heavy ice in getting nearer. The *Bear's* Captain decided to go to Nome, reaching that place on Sept. 13. On Oct. 25 the survivors were landed at the Navy yard, Esquimalt.







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SESSIONAL PAPER No. 38

The Deputy Minister,  
Department of the Naval Service,  
Ottawa, Ont.

July 23, 1915.

SIR,—I have the honour to submit herewith a financial statement showing the expenditure under the various appropriations and the revenue received by the department during the fiscal year ended March 31, 1915.

The expenditure on account of H.M.C.S. *Niobe* and H.M.C.S. *Rainbow* up to the outbreak of the war (August 4, 1914) has been charged to the Naval Service Appropriation, and after that date to the War Appropriation.

Several of the Fisheries Protection Service and Hydrographic Survey steamers were used at different periods as auxiliary war vessels and the expenditure incurred during such periods has been charged to the War Appropriation. This accounts for the decreased expenditure under the Fisheries Protection Service and Hydrographic Appropriations as compared with Fiscal Year 1913-14.

The figures given in connection with the Fisheries Appropriations and Revenues are for the whole of the fiscal year, including the first three months while under the Department of Marine and Fisheries.

A statement of stores supplied, work done and advances made on behalf of the British, Japanese and Russian Governments, etc., also submitted. These disbursements amounting in all to \$708,996.46 are not included in the amounts charged to War and Naval Appropriations, but are carried forward in Suspense to Fiscal Year 1915-16.

I have the honour to be, sir, your obedient servant,

L. J. BEAUSOLEIL,  
Chief Accountant.

## STATEMENT of Appropriation Accounts for fiscal year 1914-1915

Service.	Appropriation	Expenditure.	Balance Unexpended.
	\$	\$	\$
Naval service.....	1,000,000 00	512,805 66	487,194 34
Fisheries protection service.....	375,000 00	144,055 42	230,944 58
Hydrographic surveys.....	390,000 00	213,392 39	176,607 61
Radiotelegraph service.....	370,000 00	219,006 95	150,993 05
Tidal service.....	45,000 00	20,177 70	24,822 30
Patrol of the Northern waters of Canada.....	100,000 00	95,172 16	4,827 84
New Fisheries Protection steamers.....	230,000 00	5,422 54	224,577 46
Rewards for saving life, including life saving stations.....	125,400 00	103,622 78	21,777 22
<b>Fisheries.</b>	<b>2,635,400 00</b>	<b>1,313,655 60</b>	<b>1,321,744 40</b>
Salaries and disbursements of fishery officers.....	290,000 00	275,950 71	14,049 29
Building fishways and clearing rivers.....	30,000 00	9,670 37	20,329 63
Legal and incidental expenses.....	4,000 00	3,737 87	262 13
Canadian Fisheries museum.....	16,000 00	6,086 08	9,913 92
Oyster culture.....	6,000 00	5,998 93	1 07
Cold storage and transportation of fresh fish.....	150,000 00	71,873 96	78,126 04
Dogfish reduction works.....	60,000 00	37,882 91	22,117 09
Services of Customs officers <i>re</i> Modus Vivendi licenses.....	900 00	478 80	421 20
Fisheries Intelligence bureau.....	10,000 00	6,102 22	3,897 78
Fisheries Patrol service.....	180,000 00	162,949 86	17,050 14
Exhibit of fresh and cured fish (Toronto Exhibition).....	15,000 00	12,417 89	2,582 11
Fish breeding establishment.....	400,000 00	370,093 17	29,906 83
Inspection of canned and pickled fish.....	50,000 00	4,891 75	45,108 25
Building fisheries patrol boats.....	40,000 00	12,079 44	27,920 56
Fisheries Patrol steamer for Lake Winnipeg.....	184,400 00	163,183 51	21,216 49
Removal of obstructions Fraser River.....	110,000 00	109,918 85	81 15
Investigation of Hudson Bay Fisheries.....	15,000 00	14,275 43	724 57
Compensation to families of drowned fishermen.....	2,400 00	2,400 00	.....
International Fisheries Commission.....	5,000 00	.....	5,000 00
Expenses investigating claims for compensation under the Pelagic Sealing Treaty.....	15,000 00	14,784 76	215 24
Marine Biological stations and investigations.....	21,000 00	21,000 00	.....
	<b>1,604,700 00</b>	<b>1,305,776 51</b>	<b>298,923 49</b>



STATEMENT of Appropriation Accounts for fiscal year 1914-1915—*Concluded.*

Service.	Appropriation	Expenditure.	Balance unexpended.
	\$	\$	\$
Civil Government salaries.....	107,600 00	85,964 87	21,635 13
Contingencies.....	37,000 00	34,003 60	2,996 40
	144,600 00	119,968 47	24,631 53
Fishing bounty.....	160,000 00	157,584 14	415 86
Recapitulation.			
Naval Service.....	2,635,400 00	1,313,655 60	1,321,744 40
Fisheries.....	1,604,700 00	1,305,776 51	298,923 49
Civil government.....	107,600 00	85,964 87	21,635 13
Contingencies.....	37,000 00	34,003 60	2,996 40
	4,384,700 00	2,739,400 58	1,645,299 42
Fishing bounty.....	160,000 00	159,584 14	415 86
War appropriation.....		3,096,125 35	
Total expenditure from appropriations fiscal year 1914-15....		5,995,110 07	
Suspense Account (recoverable) transferred to 1915-16 being amount due for stores supplied and work done on behalf of the British Admiralty, Japanese and Russian Govern- ments, etc.....		708,996 46	
		\$6,704,106 53	

STATEMENT of Revenue of the Department of the Naval Service for Fiscal year ended March 31, 1915.

Royal Naval College—College fees, 12 cadets.....	\$	1,200 00	
Fisheries revenue.....		92,757 02	
Modus Vivendi (licenses to United States fishing vessels).....		8,878 75	
Casual revenue.....		19,749 68	
Miscellaneous revenue.....		1,212 39	
Wireless apparatus licenses.....		310 07	
Wireless operators examination fees.....		185 00	
Radiotelegraph revenue—			
Alert Bay Station.....	\$	572 10	
Cape Lazo Station.....		356 85	
Dead Tree Point Station.....		569 53	
Digby Island Station.....		2,47 89	
Estevan Station.....		1,841 60	
Gonzales Hill Station.....		2,940 92	
Ikeda Head Station.....		101 92	
Pachena Point Station.....		1 8 01	
Point Grey Station.....		729 01	
Triangle Island Station.....		1,281 60	
Magdalen Islands Station.....		322 99	
Midland Station.....		2 31	
Point Edward Station.....		11 35	
Port Arthur Station.....		17 71	
Sault Ste Marie Station.....		15 04	
Tobermory Station.....		42	
Kingston Station.....		1 61	
Port Burwell Station.....		5 60	
To onto Station.....		31 8	11,738 35
		\$	136,031 26



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## FISHERIES Revenue for fiscal year ended March 31, 1915.

Provinces.	Amount Collected	Refunds.	Net amount.
	\$	\$	\$
Ontario.....	918 80		918 80
Quebec.....	7,639 75		7,639 75
New Brunswick.....	14,273 99	10 00	14,263 99
Nova Scotia.....	7,415 80		7,415 80
Prince Edward Island.....	2,046 50		2,046 50
Manitoba.....	8,312 08		8,312 08
Saskatchewan.....	4,346 65	17 00	4,329 65
Alberta.....	6,168 50	66 00	6,102 50
British Columbia.....	41,673 95	250 00	41,423 95
Yukon.....	304 00		304 00
	93,100 02	343 00	92,757 02
Modus Vivendi licenses.....	8,973 50	94 75	8 878 75
Grand total.....			101,635 77

Statement of amounts outstanding in respect to stores supplied, work done, and advances made on behalf of the British, Japanese, and Russian Governments, etc., at end of fiscal year 1914-1915.

British Admiralty.....	\$ 633,979 57
British War Office.....	27,477 46
Japanese Government.....	23,640 54
Russian Government.....	18,575 28
Militia and Defence Dept.....	1,062 48
Miscellaneous.....	4,261 13
	<hr/> 708,996 46 <hr/>



STATEMENTS of Expenditure under the Naval Service and War Appro-

	H.M.C.S. <i>Niobe.</i>	H.M.S.C. <i>Rainbow.</i>	Halifax dockyard.	Esqui- malt dockyard.	Royal Naval College.	Submarines and depots.
	\$	\$	\$	\$	\$	\$
1 Pay and allowance.....	239,498 99	91,345 47		1,461 03	43,304 56	35,697 69
2 Stores and allowances.....	146,354 67	124,364 66	161,589 70	161,291 59	15,323 27	24,516 34
3 Medical services.....	248 15	819 90	30 00	892 00	179 60	659 20
4 Cadets in training ships.....					320 26	
5 Repairs and maintenance.....	34,186 00	14,737 24	40,334 53	46,858 72	9,563 44	13,342 45
6 Works, lands, bldgs., etc.....			8,786 98	126 65		
7 Misc. effective services.....	18,704 10	12,116 22	4,289 16	8,369 70	8,431 46	7,542 91
8 Headquarters.....						
9 Noneffective pay.....	7,869 58	3,471 45			622 95	
10 Coast and Harbour defences.....						
11 Recruiting expenses.....	769 88	2 00				
12 Cost of New ships.....						1,150,000 00
13 Separation allowances.....	27,067 52	4,448 82				2,526 25
14 Examination service.....						
15 Mine sweeping and patrol.....						
16 Naval intelligence.....						
17 Suspense account†.....						
18 Subsistence of prisoners.....		173 80				
Grand total.....	474,698 89	251,479 56	215,030 37	218,999 69	77,745 54	1,234,284 84
LESS.						
Arisings, etc.....			1,788 47	1,180 82		
DONATIONS,—						
Brandram Henderson Ltd.....	3,092 50					
Martin Semour Co.....	2,500 00					
Cowan Co., Ltd. (chocolate)	604 80					
	474,698 89	251,479 56	213,241 90	217,818 87	77,745 54	1,234,284 84
Proportion chargeable to,—						
Naval appropriation.....	*73,802 86	*47,454 28	202,703 84	90,537 67	77,745 54	
War appropriation.....	400,896 03	204,025 28	10,538 06	127,281 20		1,234,284 84

\*Expenditure to outbreak of war only

†Marine and Fisheries.....\$ 1,085 87  
Railways and Canals..... 3 60



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priations for fiscal year ending March 31, 1915.

H.M.C.S. <i>Shearwater</i> Depot.	H.M.C.S. <i>Prince George</i> Hospital.	H.M.C.S. <i>Protesilaus</i> .	H.M.C.S. <i>Diana</i> (depot)	Atlantic Coast Defence.	Pacific Coast Defence.	Barring- ton Wireless. Station.	General account.	Total.	
\$	\$	\$	\$	\$	\$	\$	\$	\$	
65,060 38	6,573 35		54,269 56	10,798 23			17,211 48	565,220 74	1
55,601 67	9,928 36	14,739 59	40,705 01	11,737 64			27,165 97	793,318 47	2
772 15	3 00		776 52	33 00			106 50	4,520 12	3
								320 26	4
11,886 90	5,467 15		1,582 52	1,153 22			34 60	179,146 77	5
						40,857 34		49,770 97	6
5,337 73	25,597 66	2,533 94	11,501 18	726 93			55,804 38	160,955 37	7
							20,932 73	20,932 73	8
							205 70	12,169 68	9
				59,762 22	71,820 55			131,582 77	10
53 00			6 00				259,83	1,090 71	11
								1,150,000 00	12
4,112 60			7,033 05					45,188 24	13
				123,572 15	135,266 97			258,839 12	14
				226,205 90	11,313 83			237,519 73	15
				1,321 56	4,700 09			6,021 65	16
							1,089 47	1,089 47	17
192 10			45 00					410 90	18
143,016 53	47,569 52	17,273 53	115,918 84	435,310 85	223,101 44	40,857 34	122,810 66	3,618,097 70	19
								2,969 29	..
									..
							6,197 30	6,197 30	..
									..
143,016 53	47,569 52	17,273 53	115,918 84	435,310 85	223,101 44	40,857 34	116,613 36	3,608,931 11	
				305 42	98 93		20,157 12	512,805 66	
143,016 53	47,569 52	17,273 53	115,918 84	435,005 43	223,002 51	40,857 34	96,456 24	3,096,125 35	



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STATEMENT of Jobs Completed in the Workshops and Stores Supplied at the  
Halifax and Esquimalt Dockyards during fiscal year 1914-1915.

Service.	Halifax.	Esquimalt.
Naval service.....	\$ 322,695 33	\$ 254,554 17
Fisheries protection service.....	36,726 39	40,820 46
Hydrographic surveys.....	18,821 14	10,835 76
Life saving service.....	1,451 85	1,248 10
Radiotelegraph service.....	588 93	7,616 38
Fishery patrol service.....	4,423 97	.....
Dept. of Militia and Defence.....	7,463 22	210 27
Dept. of Marine.....	3,790 34	5,511 50
Dept. of Railways and Canals.....	106,73	.....
Dept. of Customs.....	188 53	.....
British Admiralty.....	85,887 37	128,305 65
Japanese Government.....	.....	31,244 65
Patrol of Northern Waters of Canada.....	.....	1,341 07
Sundries.....	.....	896 89
	\$ 482,143 80	\$ 482,584 90
Wages paid.....	\$ 119,569 48	\$ 119,696 65
Salaries.....	\$ 25,668 25	\$ 23,057 47



SESSIONAL PAPER No. 38

## NAVAL SERVICE.

OTTAWA, April 1, 1915.

The Deputy Minister,  
Department of Naval Service,  
Ottawa, Ont.

SIR,—I have the honour to report regarding the Naval Service for the fiscal year ending March 31, 1915.

The progress, both mental and physical of the cadets at the Royal Naval College at Halifax still proves most satisfactory.

An examination for the entry of cadets to the college was held in May, 1914, and eight candidates were entered. The officers of the college continue to report most favourably on the cadets, and the senior cadets and midshipmen who have been serving in ships of the Royal Navy and H.M.C.S. *Niobe* and other Canadian vessels since the outbreak of the war have also been most favourably reported upon and have proved themselves capable and efficient.

Four midshipmen: Messrs. Silver, Palmer, Hatheway and Cann, were unfortunately lost in H.M.S. *Good Hope* when that vessel was sunk in action.

With regard to the activities of the Naval Service Department in relation to the war, preparations having previously been made to meet all contingencies which could be foreseen, it was only necessary to carry out or expand these preparations when war appeared imminent.

At the time *Rainbow* had been commissioned for patrol duty in Behring Sea and was therefore ready for immediate service, whilst *Niobe* was laid up at Halifax with a care and maintenance crew on board, which ensured her being kept in such a condition as would enable her to be placed in commission at short notice.

On the declaration of war *Niobe* and *Rainbow* and the officers and men serving in them, were placed at the disposal of the Admiralty. Both these vessels since that time, have been employed upon continuous and arduous duties at sea.

Arrangements were immediately made to commission *Niobe* and to complete her crew to full sea-going requirements. This was done partly by the transfer of the Imperial officers and men of the sloops *Algerine* and *Shearwater*, which, owing to their small fighting value, had been ordered by the Admiralty to pay off at Esquimalt, and partly by the inclusion of one hundred Newfoundland naval reserve men; the remainder of the crew being recruited from men who had served in the British navy and were resident in the Dominion. A large number of these volunteered their services and as many as necessary were entered for service during the period of the war.

The Dominion Government shortly before the outbreak of war purchased two submarines which were building at Seattle for the Chilean government. The crews were recruited from officers and men in the Dominion, the government being fortunate in this respect in obtaining the services of two retired officers of the Royal navy who had previous experience in submarines. These vessels also were placed at the disposal of the Admiralty.

Permission was also obtained from the Admiralty to use the *Shearwater* as a depot ship for the submarines.



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These three vessels have all been actively employed in the defence of the British Columbia coast.

Naval depots have been established at Halifax and Esquimalt, in the former place for the accommodation of supernumerary ratings awaiting draft, and in the latter for the training of the Royal Naval Canadian Volunteer Reserve officers and men.

A large number of other vessels are being used for various subsidiary duties.

The Ice-breaker *Earl Grey*, on her sale to the Russian Government, was transferred to this department to be sent to Archangel. A crew of naval ratings was provided and the vessel was successfully navigated to her destination, the voyage of 3,000 miles being completed in fourteen days.

On arrival at Archangel she was turned over to the Russian authorities. The crew returned by ordinary steamer.

*Personnel.*—Recruiting has been actively carried on to complete *Niobe's* crew as previously stated and to obtain the requisite crews for the other vessels employed on subsidiary duties, preference being given to men with previous naval experience.

The naval volunteers which were established just previous to the outbreak of war, developed largely in the West, where some three to four hundred officers and men are enrolled. Steps are now being taken to enroll volunteer officers and men for the Atlantic division to meet requirements of ships and establishments on the east coast.

These volunteers have done good service both ashore and afloat, a considerable number having served continuously in the *Rainbow* since the outbreak of hostilities, and for other purposes as requisite. Their training is being continuously carried on.

The department has acted as recruiting agent for the Admiralty. A large number of Imperial Service officers and men have been reached and arrangements made for their transportation from all parts of the Dominion to England.

The health of the officers and men of the Canadian Navy has continued to be satisfactory.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,

*Vice-Admiral-Director of the Naval Service.*



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## FISHERIES PROTECTION SERVICE.

May 1, 1915.

The Deputy Minister,  
Department of Naval Service,  
Ottawa, Ont.

SIR,—I have the honour to report regarding the Fisheries Protection Service for the fiscal year ending March 31, 1915, as to the number of vessels and men employed, the whereabouts of the different vessels, the names of the commanding officers and brief descriptions of the vessels.

Extracts from the reports of the various commanding officers are included to give some idea of the work carried out during the season.

On the outbreak of war in August all the Fisheries Protection vessels on the east and west coasts were immediately required for examination service, mine-sweeping and other duties as laid down in the schemes of defence for Halifax and Esquimalt and, with the exception of one or two instances where they have been sent to investigate complaints of fishermen, they have continued to carry out these duties up to the present time.

The Fisheries Protection Service consisted of ten vessels last season, under the direct supervision of the Department of the Naval Service.

## NAMES OF VESSELS AND THEIR COMMANDING OFFICERS.

*Canada*.—Lieutenant C. J. Stuart, R.N.R.

*Curlew*.—W. J. Milne.

*Constance*.—J. E. Morris.

*Petrel*.—Clement Barkhouse.

*Gulnare*.—C. T. Knowlton.

*Vigilant*.—P. C. Robinson.

*Galiano*.—Lieutenant R. M. Pope, R.N.R.

*Malaspina*.—Holmes Newcomb.

*Restless*.—Charles Moore.

*Newington* (Chartered).—P. J. Ledwell (Fishery Officer).

## C.G.S. "CANADA"

Is a twin-screw steel ship, whose length is 206 feet, beam 25 feet, draught 11 feet 2 inches, registered tonnage 411 tons and speed 16 knots. She is armed with two 12-pdr. Q.F., and two 3-pdr. Hotchkiss guns, is electrically lighted throughout, and is fitted with a powerful searchlight. Her complement is 60 officers and men all told, and she was built by Vickers Sons & Maxim, Ltd., England, in 1904. She is commanded by Lieutenant Charles J. Stuart, R.N.R.

*Canada* was re-commissioned on the 1st April, 1914, at Shelburne, where she had gone on the completion of her annual refit. She left Shelburne on the 14th, arrived Halifax on the 18th and on the 21st took the Dominion Defence Committee to the mouth of the Harbour, where the various forts were inspected.



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From the 29th to the 7th May ship cruised to the westward and on the 9th May proceeded to the Magdalen islands. After being delayed at Port Hawkesbury and Souris by drift ice she arrived at the Magdalen islands on the evening of the 16th May and, during the next two days, saw the fishing fleet arrive and depart. She left the Islands on the 19th May for Bay St. Lawrence where the lobster factory was inspected; on the 22nd coaled at North Sydney and returned cruising around Cape North to watch the schooners which had remained in that vicinity to fish. The life saving station at Cheticamp was inspected and on the 29th May *Canada* went to the assistance of an American schooner *Centennial* off Green point and towed her into the Gut of Canso.

On the 1st June ship arrived at Halifax, where some minor repairs were taken in hand, and on the 9th she left to cruise with the United States mackerel fleet. On arrival at Neil's harbour, C.B., on the 18th June, *Canada*, with the customs officer of that port, investigated complaints of local fishermen against the United States schooner *Laverna* trawling within the three mile limit, and on the 23rd left Louisburg and cruised west with the last of the mackerel fleet, arriving Halifax on the 26th June.

During the greater part of July ship was in dockyard hands, after which she proceeded to arrange for the annual practice in examination service, and on the outbreak of hostilities she was at once taken over for war service. On the 7th October she was returned to the Fisheries Protection service for a short time and sent to relieve *Constance* and watch the United States seiners off Port Hood, N.S. Ship cruised between Port Hood, Pictou and Summerside till the 11th October, only sighting one trawler, and then proceeded up the Miramichi river to Newcastle where the director of naval service embarked, and she proceeded to Cheticamp. *Canada* then left for Halifax and on the 20th, after coaling, proceeded to Yarmouth and once more embarked the director of naval service, who inspected the life saving station at Digby, and left the ship. Ship then returned to Halifax and war service, under which service she remained for the rest of the year.

#### C.G.S. "CURLEW"

Is a composite, single-screw vessel, whose length is 116 feet 3 inches, beam 19 feet 8 inches, draught 11 feet, speed  $10\frac{1}{4}$  knots and registered tonnage 157.85 tons. Her complement is 22 officers and men all told, and she is commanded by Captain W. J. Milne.

The 1st April 1914 found the ship in commission at Yarmouth, watching the United States fishing vessels, several of which were using Yarmouth harbour.

On the 5th *Curlew* went to the assistance of a Canadian schooner, *Curlew*, which grounded in the harbour and on the 8th, the U.S. vessels having changed their harbour farther eastward, she cruised north to St. Mary's Bay, Westport, Digby and St. John; found all branches of the fisheries dull and bait scarce. Ship returned via Campobello and Grand Manan and found all fisheries, except the lobster, behind their usual condition, owing to the cold season. On the 27th April she cruised to Passamaquoddy bay and Grand Manan.

The pollock commenced schooling early in May to the southward of Grand Manan and were said to be more plentiful than they had been for twenty years. On 6th May *Curlew* visited Bay View and on the 9th, Little Wood island; at the latter place finding the life boat in need of repair, towed her to St. John and back. A fishing boat, *Hattie L.*, was taken in charge on 15th May for breaking the fishery laws in the pollock grounds off Grand Manan and after trial by the inspector of fisheries the occupants were heavily fined. Whenever opportunity occurred during the season ship cruised to St. John and along the St. John County shores in search of illegal fishing. On the 20th June the shores



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from St. John westward were searched for illegal lobster fishing but none was found, and on the 27th *Curlew* located an uncharted shoal off Green island, Grand Manan.

On 1st July ship cruised the St. Croix river and on the 8th to Seal island to watch the United States fishing vessels fishing for lobsters outside territorial waters. The shores of Digby county were searched on 14th July and on the 30th *Curlew* received orders to proceed to Halifax, where she was placed on war duty which continued till the end of the fiscal year.

## C.G.S. "CONSTANCE."

Is a single screw composite steamer, whose length is 115 feet 6 inches, beam 19 feet 6 inches, draught 11 feet 6 inches, and registered tonnage 125 tons. Her complement is 23 officers and men all told, and she is commanded by Captain J. E. Morris.

*Constance* was in dockyard hands undergoing repairs until the 2nd June, when she commissioned, swung for adjustment of compasses, and on the 3rd proceeded to sea cruising with the American seiners until the 10th June. On the 16th passed through the Gut of Canso to take up duties on station around Cape North and Prince Edward island. Ship visited Cheticamp on the 23rd and on the 24th arrived at Pictou. After conveying a member of the dockyard staff from Pictou to Cheticamp she proceeded cruising on her station until 2nd July. On the 3rd July she embarked the Minister of Militia and party at Charlottetown and conveyed them to Pictou, after which cruising was continued until the 9th. On the 10th ship proceeded to Richibucto with stores for the life saving station and then carried out fisheries duties in the Straits of Northumberland until the 28th. On the 29th *Constance* conveyed the Minister of Railways and Canals from Pictou to Cape Tormentine, Carleton point and Point du Chene, sailing from the latter place on the 31st July for Halifax, where ship was put on war service until 7th September, on which date she proceeded to Murray harbour. Here the reports received regarding beam trawlers operating inside the three-mile limit were thoroughly investigated and ship sailed for Georgetown, thence to Port Hawkesbury, and arrived at Halifax on the 12th. On the 13th she again sailed for Prince Edward island and continued cruising on station in company with the American seiners, boarding all vessels arriving in port, till 13th October. On the 14th October the seiners left for home waters and ship cruised westward towards Halifax, arriving there on the 15th. *Constance* was then taken over for war service again and continued until the end of the fiscal year in that service.

## C.G.S. "PETREL."

Is a steel, single-screw ship, whose length is 116 feet, beam 22 feet, draught 9 feet, speed 11 knots, and registered tonnage 191 tons. Her complement is twenty-four officers and men all told, and she is commanded by Captain Clement Barkhouse.

This ship was undergoing repairs at Halifax until May 5th, when she proceeded to Liverpool, where she was hauled on the marine railway for cleaning and painting bottom. On the 14th she proceeded west to meet the American mackerel fleet and took up station off Shelburne. On the 20th May the first of the fleet arrived and *Petrel* cruised east with them, calling at Lockeport, Liverpool, La Have river, Lunenburg, Chester, Prospect and Terrance bay. The first fish were taken on the 29th May off Pearl island. Ship continued cruising with the fleet as it proceeded eastward until 19th June, when she was relieved



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by *Canada* off Louisburg, and then proceeded to North Sydney, watching for stragglers. On the 22nd June she cruised through the Bras d'Or lakes towards Canso and then west calling at Isaac harbour, and arriving at Halifax on the 26th. *Petrel* then took up her station on the western division until the 30th June when she proceeded to Seal island and on July 3rd investigated the wreck of the *Alice Gertrude*, afterwards cruising on her station until 30th July on which date she was ordered to Halifax for war duty, since which time she has not been able to undertake fisheries patrol.

The spring mackerel fishing was reported the best in years; ninety-eight American fishing vessels worked on the division patrolled by *Petrel*, which ship boarded and examined them 162 times.

#### C.G.S. "GULNARE."

Is a steel, single-screw vessel, whose length is 137 feet, beam 20 feet 5 inches, draught 12 feet, registered tonnage 262 tons. Her complement is twenty-five officers and men all told, and she is commanded by Captain C. T. Knowlton.

*Gulnare* was in Dockyard hands until 7th July, a large amount of work being necessary, including the installation of a new boiler. On the 17th July ship proceeded on fisheries service, anchoring in entrance to the North West Arm until the 20th, owing to fog. She then cruised eastward and on the 24th off Cape North met a heavy west wind and anchored in Aspy bay, later proceeding to Cheticamp and thence to Pictou on the 25th. Georgetown was reached on the 27th and on the 28th ship proceeded in a southerly direction towards Halifax where she arrived on the 30th July and was immediately gotten ready for war service on which she has since been employed.

#### C.G.S. "VIGILANT."

Is a twin-screw steel ship, whose length is 177 feet, beam 22 feet, draught 9 feet 6 inches, registered tonnage 242 tons and speed 16 knots. She is electrically lighted throughout and fitted with a powerful searchlight. Her complement is thirty officers and men, all told, and she is commanded by Captain P. C. Robinson.

The necessary repairs having been made during the winter, ship commissioned on 1st April, but owing to delay in inclining her, did not put to sea until the 17th, when she commenced cruising on station and also visited several life saving stations and inspected them. Very little poaching was found during the spring fishing.

On 9th July ship embarked the Director of Naval Service at Cobourg and conveyed him on a trip of inspection to the life saving stations at Port Hope, Long Point, Point Pelee, Goderich, Kincardine and Southampton, the Director of Naval Service leaving the ship at Penetanguishene on the 16th. *Vigilant* then docked at Collingwood for necessary repairs till the 28th, when the Consulting Naval Engineer came aboard and *Vigilant*, proceeded to Kincardine, thence to Port Dover, where the Consulting Naval Engineer disembarked.

During August and September United States fishermen were active in the vicinity of Long Point and a sharp watch was kept to prevent poaching, a considerable quantity of nets being taken. The greater part of October was spent in assisting to repair the telephone line between Long Point life saving station and Port Rowan. November was so stormy as to prevent cruising to any great extent and on the 22nd orders were received at Kingsville to return to Port Dover and put ship in winter quarters. On the 24th November the commanding officer and part of the crew left for Toronto where they took



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charge of C.G.S. *Speedy* as far as Quebec, the first officer being left to put *Vigilant* in winter quarters, which was done by the 30th November. During the winter ship was overhauled and repaired in preparation for the re-opening of navigation.

*Vigilant* steamed 6,855 miles during the season of 1914 and seized 576 nets.

## C.G.S. "MALASPINA."

Is a steel single-screw vessel, whose length is 160 feet, beam  $26\frac{1}{2}$  feet, draught  $12\frac{1}{2}$  feet, speed  $14\frac{1}{2}$  knots, and displacement 700 tons. She is electrically lighted throughout, fitted with a powerful searchlight and armed with one 6-pdr. Q.F. Gun. Her complement is thirty-three officers and men all told and she was built by the Dublin Dockyard Co., Dublin, Ireland, in 1913. She is commanded by Captain Holmes Newcomb.

At the beginning of the fiscal year *Malaspina* was cruising in the Hecate straits and on 3rd April seized the United States schooner *Prince Olaf* of Seattle, found fishing within the three mile limit near Zays Island; she was towed to Prince Rupert, her fish sold and the vessel handed over to the agent of the Marine Department.

Ship then continued cruising until the 22nd April when she returned to Esquimalt for repairs. On the 14th May she was docked and on coming out on the 23rd, embarked the Director of the Naval Service and cruised northward, calling at various places en route. At Hecate cove while the Director of the Naval Service inspected the *Galiano*, the officers of *Malaspina* located an uncharted rock near Limestone island. All the principal ports on the west coast of Vancouver island were inspected and also the life saving stations on this trip and ship returned to Esquimalt on 8th June.

From the 9th to the 21st June *Malaspina* underwent changes and alterations and on the 22nd she proceeded to sea to test quick-firing gun.

The month of July was spent cruising as necessary until 1st August, when ship was ordered to return to Esquimalt for war service.

## C.G.S. "GALIANO."

Is a steel, single-screw vessel, whose length is 160 feet, beam  $26\frac{1}{2}$  feet, draught  $12\frac{1}{2}$  feet, speed  $14\frac{1}{2}$  knots, and displacement 700 tons. She is electrically lighted throughout, fitted with a powerful searchlight and is armed with one 6-pdr. Q.F. gun. Her complement is thirty-three officers and men all told and she was built at Dublin, Ireland, by the Dublin Dockyard Co., in 1913. She is under the command of Lieutenant R. M. Pope, R.N.R.

*Galiano* left Esquimalt on the 25th April on her first commission after being turned over to the Canadian Government, and, after coaling at Union and communicating with the Fisheries Overseer at Alert bay, she proceeded cruising in the Hecate strait, thence to Queen Charlotte islands, visiting the banks off Scudder point, Aristazabal and Estevan islands, finally arriving at Prince Rupert on the 8th May. After coaling, cruising was continued in the Hecate strait and Dixon entrance until May 31st, when ship proceeded to Bull harbour to meet *Restless*, with which ship she cruised to Hecate cove, where *Galiano* was inspected by the Director of Naval Service and then proceeded to Clayoquot and Barkley Sounds, calling at Port Alberni for mail. She continued cruising among the islands for some time, finally returning to Esquimalt on the 26th June.

On 12th July she again left Esquimalt and proceeded to Captain cove to meet *Malaspina*; then cruised in the vicinity of the Queen Charlotte islands and



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on to Prince Rupert, where the commanding officer met the chief inspector of fisheries. Left Prince Rupert on the 22nd July to cruise around the islands until, at Naden Harbour, orders were received to report at Esquimalt, where ship arrived on 1st August and at once proceeded on war service, which duty she continued until the 12th March, 1915. On that date she left Esquimalt for Prince Rupert and after interviewing the fishery overseer proceeded cruising in Hecate strait, returning to Prince Rupert on the 26th March for stores. Left Prince Rupert on the 29th and that afternoon received orders by wireless to return to Esquimalt.

## C.G.S. 'RESTLESS.'

Length 71 feet, beam 17 feet, draught 7 feet, is under the command of Captain Charles Moore, and, at the beginning of the fiscal year was on patrol duty on the northern coast of British Columbia with headquarters at Prince Rupert. On the 8th April she returned to Esquimalt for repairs, which were commenced on the 14th and completed on the 22nd May, ship leaving on that day for Union where she coaled and then proceeded north to Bull harbour to report to the Director of Naval Service. From Bull harbour she proceeded to Prince Rupert and resumed patrol duty in the northern district between Milbank sound and the Dundas islands, at which duty she continued until the 29th July when she received orders to return to Esquimalt, and arrived there on the 3rd August. *Restless* then proceeded on war duty.

## C.G.S. "NEWINGTON."

Fisheries officer P. J. Ledwell, was in dockyard hands until the 28th April, when she proceeded to Triangle island with coal for the wireless station there, at the same time conveying two fisheries inspection launches to Alberni and Clayoquot, after which she cruised on the west coast of Vancouver island, watching the American fishermen. On the 17th May the commanding officer interviewed the fisheries inspector at Alert bay, then cruised again, finally arriving at Union bay on the 6th June, where boiler was washed out and minor repairs made. Ship again proceeded cruising on her station on the 9th June and continued for the remainder of the month, returning to Victoria on the 30th and leaving again on the 6th July. Cruising on the west coast of Vancouver island was resumed during July, but on the outbreak of war *Newington* was told off for other duties.

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Since the sinking of the German Asiatic squadron, which did away, to a great extent, with the danger of an attack on the west coast of British Columbia, the fisheries protection ships on that coast have, in turn, gone about their regular duties, *Galiano* and *Malispana* also visiting the several wireless stations with stores, etc.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,

*Vice-Admiral, Director of Naval Service.*



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## REPORT OF THE SURVEY OF TIDES AND CURRENTS.

OTTAWA, March 31, 1915.

The Deputy Minister,  
Department of the Naval Service,  
Ottawa.

SIR,—I have the honour to submit the following report regarding the Survey of Tides and Currents during the twelve months ending March 31, 1915.

There are several directions in which progress has been made, in addition to the regular work of maintaining the tidal stations and publishing tide tables. In British Columbia, revised methods have been devised for the calculation of slack water in the more important narrows; and these methods have also been applied in the reduction of the new observations which have been obtained. This places the whole question of slack water, which is so important to navigation, upon an improved basis. Similar progress has been made in Hudson bay and the strait leading to it. The best results which can be secured, have now been deduced from the observations taken in Hudson strait during the Gordon expeditions. Recent observations at Nelson and in James bay have also enabled satisfactory tide tables to be prepared, accompanied with further data. In eastern Canada one of the most complex regions in the Gulf of St. Lawrence has been investigated with good result. The valuable tide levels, deduced from the investigations of this survey, are now much in demand as a basis for extended levels which are being carried out by several departments. The foresight in providing for accurate tide levels from the beginning of this survey, twenty years ago, is thus bearing fruit.

## TIDAL OBSERVATIONS.

The principal tide stations have been maintained in continuous operation throughout the year, and one of them has been rebuilt. The tide column at St. John, N.B., which was placed in 1894, has demanded considerable repair in recent years; and on account of the large amount of work now in progress in St. John harbour, it was decided to rebuild it entirely. To do so, it was necessary to place a vertical steel cylinder filled with concrete as a foundation, extending from the bottom to low water, a height of 25 feet. Supported by this cylinder is an upper length of 31 feet, which extends from low water to the wharf level. This upper cylinder, built of heavy plate to withstand the water pressure, contains the tide pipes and encloses a space around them in which heating is provided in winter to prevent them from freezing. The cylinder is also lined with a wood sheathing to keep out the cold. The total height of the two cylinders is 56 feet; and upon them the tide-house is set, which contains the registering instrument and the floating scale, by which the tide levels are accurately maintained. This construction work was carried out under the supervision of Mr. H. W. Jones, who met with a number of rather troublesome difficulties from sunken timbers in placing the foundation. The expense of this re-construction is fully justified in view of the need for tide levels for the extensive works which are in progress in St. John harbour, without speaking of the main object of obtaining tidal data for the calculation of the



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tide tables. The tides throughout the whole extent of the Bay of Fundy, where the rise is so great, can be referred with the best advantage to St. John, as a port of reference; so that these tide tables are the basis for this region.

The tidal record dealt with during the year was from the three leading tidal stations in British Columbia. Seven years in all have been tabulated, and submitted to harmonic analysis. This analysis will improve the basis for the calculation of the tide tables. This is an important step, as the tables of slack water are deduced in turn from the time of high water and low water in the tide tables.

In Eastern Canada, tidal stations were maintained during the summer at Bathurst, Point Sapin at the entrance to Miramichi bay, Richibucto and Shediac bay. At these harbours a large outlay has been incurred for dredging, or for breakwaters that have been built, which amply justifies the trouble and expense of obtaining tidal information for them. The observations at Bathurst will afford tidal data for that harbour, which is rapidly developing, because of the deepening of the entrance which is in progress. The region between Miramichi bay and Cape Tormentine is a very complex one, because of tidal interference. As a solution has now been found for these complexities, it may be of interest to record the result briefly, because of the light that it will throw on tidal questions.

The tide which enters the Gulf of St. Lawrence through Cabot strait, develops a marked diurnal inequality in its progress along Northumberland strait. By the time it reaches Charlottetown, the two tides of the day are more different in range than average springs and neaps. This inequality follows the declination of the moon, and only disappears when the moon is on the equator. Beyond Cape Tormentine in the region of Shediac bay, the inequality reaches its maximum development; a result which may in part be due to the interference of the tide which comes around the west end of Prince Edward island, and meets it there. The outcome is that the tide has a pronounced range once only in the day. At Richibucto it is the rise which is pronounced, and the other tides remain near the low-water level. In Shediac bay the fall is pronounced, with little variation from the high-water level at the other tides. At these two places, less than forty miles apart, the time of the tide is entirely out of relation; and the problem was to find any reference station with which the difference in time would be constant. The similarity of the tide in Shediac bay to the Strait of Georgia was strangely evident, as the tide there varies little from the high-water level except once in the day, when there is a decided fall to low water. When trial was made, it was discovered that the difference in time between Shediac bay and Sand Heads in the Strait of Georgia was more constant than with any tidal station in Eastern Canada. This corroborates the view that it is possible to correlate the tides at distant places, provided that they are of the same type, even if the range is very different. It is thus the features of the tide and not its range, which have the most weight. In this case, the tide in these two localities may be described as a declination-tide of a pronounced type.

For practical purposes, it is the tide that has the greater rise or greater fall for which it is more needful to have data. The tide at Richibucto can be referred to St. Paul island, which serves as a reference station for the region extending northward and including Miramichi bay. The tide in Shediac bay can be referred to Charlottetown, with fairly good result. We have thus an indication of the proper dividing line between the western limit of Northumberland strait and the open Gulf of St. Lawrence, as regards tidal characteristics.

Assistance was given in obtaining the tidal information required for the Ferry service to P.E.I., which is under construction between Cape Tormentine and Carleton point opposite. The tide levels at Cape Tormentine, which have resulted from earlier observations, were connected with new bench marks through co-operation with Mr. A. E. Fripp. These levels will thus be preserved



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for reference, which will be a valuable advantage for the work. A tide gauge was also placed at Carleton point, to obtain the relation of the tide to Pictou which is the reference station for this part of the strait. Simultaneous observations were obtained during the autumn months at these two places and they will be continued next season. The tidal data thus secured will complete the necessary information for this project; as the currents in the narrows at Cape Tormentine have already been investigated and the results published. The time of the maximum strength of the currents in each direction, which has thus been determined, will be of value in the operation of the Ferry service.

## CO-OPERATION WITH OTHER SURVEYS.

In addition to the tidal observations obtained by this Survey, some information of value has been secured through co-operation with others. Six registering gauges have been supplied to other Surveys with complete outfits, and instructions for operating them. These have been furnished to the Hydrographic Survey for use on the lower St. Lawrence, in British Columbia, and in James bay; to the Department of Railways and Canals for Port Nelson; and to the Public Works Department, for use in the St. John river. The information thus obtained is indirectly useful for the purposes of this Survey, and in some cases observations are secured from new localities. The registering instruments thus supplied are an important economy to these Surveys, in saving time and the need of employing men to take readings on fixed scales, which would otherwise be required.

## INVESTIGATION OF THE CURRENTS.

Further observations of the time of slack water in the passes of British Columbia have been obtained during last season. The passes investigated were Sansum narrows and Dodd narrows on the costal route along the east side of Vancouver island from Nanaimo to Victoria. Further observations were also taken in Porlier pass, and a tide gauge was established at Caulfeilds, near Point Atkinson, to obtain the tide of the Strait of Georgia for comparison. Later in the season observations of slack water were made in Seechelt rapids, at the entrance to an extended inlet which is becoming a lumber region of consequence.

Observations at Porlier pass were taken by the lightkeeper, as the lighthouse stands at the narrows where the turn of the current is well seen. It was only necessary to provide him with a chronometer for accurate time. At Sansum narrows and Dodd narrows there are no habitations in the vicinity from which the turn of the current can be observed. Positions were selected where fresh water could be obtained, and temporary shacks were erected for the accommodation of the observers. At Dodd narrows, the shelter was of more substantial construction to serve during the ensuing winter. At Seechelt rapids similar arrangements were made, as the shores in the vicinity of the rapids are uninhabited. It was difficult to land material and supplies in this vicinity because of the violence of the current and the short duration of slack. This emphasizes all the more, the need of some method of knowing the time of slack water in getting out lumber from the inlet. The essential for these observations is accurate time; and there was no means of obtaining it at any of these localities except by the use of chronometers. Mr. S. C. Hayden supervised this work as well as the erection of the tide gauge at Caulfeilds, and he took the opportunity, during the season, of inspecting the permanent tidal stations where this was necessary.

In regard to the passes of the Pacific coast, a very important advance has been made during the year in the method of calculation of slack water, for



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Seymour narrows, and also for several passes which open off the Strait of Georgia. The early investigations in Seymour narrows showed that the time of slack water had no constant relation to the tide in the locality, but that it stood related to the tide of the open Pacific. The reason of this appears to be that the flow of water in the narrows is influenced by the tide which comes around both ends of Vancouver island. The best reference station for the tide on the open coast, is Port Simpson. The tide of the Pacific may be characterized as a declination-tide in which the leading characteristic is an alternation in range with the upper and lower transits of the moon, which gives rise to diurnal inequality. It was eventually ascertained that high water slack could be found by means of a constant difference with Port Simpson, and low water slack by a difference with the next following low water there. The low water difference was not constant, however, but showed a marked alternation with the large and half tides. The variation amounted on an average to nearly thirty minutes. With allowance for this variation, values were obtained which have given satisfactory results for the calculation of slack water tables for Seymour narrows. The calculations were correct so long as the tides were pronounced in their rise and fall; but it was found that shortly after the moon crossed the equator, when the diurnal inequality disappeared and the tides for a time were nearly equal, that the values gave irregular results. It is true that the current is not so strong at this period as when the tides of more pronounced range occur, but an endeavour was made to overcome the difficulty.

It would be quite technical to describe the investigation which was required to secure better results, and one of the chief difficulties resulted from the observations giving slack water in the day time only, so that one series of tides was wanting. There were however, observations during nine months in three different years as a basis, which afforded a large number of observations; and tidal record for Port Simpson was available throughout these years for comparison. The investigation showed a reason for the main difficulty which had been encountered; as it was found that the point in the series of values where the variation in the difference fell to zero, was at an interval of eight tides from the moon's crossing of the equator. The reason for the discordant results given by the former method for the tides immediately after the crossing of the equator was thus explained. It was also ascertained that the best result could be secured by following the upper and lower transits of the moon, instead of the large and half tides. The variation between these shows increasing divergence from the eighth tide above mentioned, until it attains a maximum variation which exceeds one hour. A series of values was finally arrived at, to cover the change in the difference, as thus ascertained. This method for the calculation of low water slack will be used for future years; and it is not likely that it can further be improved upon, because of the long series of observations on which it is now based.

In dealing with the northern passes in the region of Seymour narrows, it was found that the time of slack water in them could be obtained by the use of a difference from Seymour narrows. With this indication, an endeavour was made to obtain a similar result for the southern passes off the Strait of Georgia. This has resulted in a new method of dealing with them; for it is found that the variations between slack water and the time of the tide are concordant in similarly situated passes. The difference in time of slack water between two corresponding passes may thus prove to be nearly constant, as the variations with the time of the tide are the same, and therefore disappear. This method has been applied to the new observations in Dodd narrows, Sansum narrows and Seechelt rapids; as it is found advantageous to deduce the time of slack water in these from Porlier pass, Active pass and First narrows respectively. For these three passes full tables of slack water are published;



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and the differences for the new passes are applied to these in the same manner that ordinary tidal differences are applied to the tide tables. The values required will be given in the tide tables for next year; and meanwhile a Notice to Mariners has been issued with advance information for the purpose. The data for the other passes in this region have been revised to accord with this method.

The observations at Porlier pass and Dodd narrows will be continued until next season. The object of this is two-fold; to obtain the best possible values for Dodd narrows and to improve the basis of calculation for Porlier pass. This will be done by means of the comparison with the tide near Point Atkinson already mentioned; as the tide there is found to be practically identical with the original tide station at Sand Heads, which has been discontinued; as the lighthouse is replaced by a lightship.

## HUDSON BAY AND STRAIT.

In Hudson strait the reduction of the extended observations obtained during the Gordon expeditions of 1884, 1885 and 1886 have been carried to completion. The general method which was followed, was to obtain a relation between Ashe inlet at the middle of the strait and some good reference station for which tide tables are calculated. At Ashe inlet also, the longest series of observations was obtained, extending over parts of three years. The total length available was seven months of day and night observations and eleven months in the day time only. These were compared with St. John, N.B., by means of tide tables for those years which were recalculated for the purpose. An excellent difference of time with St. John was thus established, which will enable the time of the tide at Ashe inlet to be known. The time of the tide is of primary importance for practical purposes, to afford a basis of comparison with the strong tidal streams in this strait.

With this basis for the middle of the strait at the narrow part where the width is 70 miles, the remaining localities were brought into relation with Ashe inlet. These are Port Burwell, Stupart bay, DeBoucherville and Port Laperriere. The observations available made it possible to obtain simultaneous comparisons with Ashe inlet during three to seven months for all of these localities except Laperriere, which it was necessary to compare in the first place with DeBoucherville. It was found as a result, that the time of the tide is from half an hour earlier to an hour and a half later, as compared with Ashe inlet. The precise results will be given in the tide tables for next year. The investigation completes the tidal data throughout the extent of Hudson strait, which comprises a length of 540 miles. Tide tables for Nelson for the coming season have been calculated by the method explained in the last report which has been found very satisfactory when checked with observations taken there.

With these tables data are given for Churchill and also for Moose Factory in James bay. The range of the tide at Moose Factory in relation to Nelson has been worked out at the request of the Timiskaming and Northern Ontario railway to throw light on the design of the proposed terminal works there.

It is hoped to obtain further observations at Nelson through the Railways and Canals Department, to which registering gauges have been supplied for the purpose. Some observations have also been secured in James Bay, in co-operation with the Hydrographic Survey. Tidal data will thus be available for other localities in James bay when they become necessary.

An accurate value for mean sea level at Nelson was desired by the Topographical Surveys Branch of the Interior Department, as a check upon the end of their extended line of levels from Winnipeg to Hudson bay. For this purpose three months of observations were selected, during which there was no



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wind disturbance of consequence; and the record is continuous day and night without any break. The three months are exact lunar periods to balance the springs and neaps, and they are in two different years. The results agreed closely with each other, and the level obtained is referred to the bench mark which defines the low-water datum of the chart.

#### INFORMATION SUPPLIED AND TIDE LEVELS.

The work done under this heading is on the increase from year to year; and the information asked for, has been largely of the nature of tide levels and other data required as a basis for levelling operations, which are now being carried out in several regions by different departments. To supply this information it often entails a considerable amount of special work to obtain results in the form desired. The character of the information may serve to illustrate the value of the results of this survey to other departments, in addition to its primary service to navigation.

The only satisfactory basis for extended levelling, is the mean level of the sea, and this is used for a general reference datum in all civilized countries. It is evident that this can only be determined by means of tidal observations. From the outset of this survey, twenty years ago, bench marks were established for reference at all the principal tidal stations where observations were obtained continuously day and night throughout the year. As all the tide gauges are on timber structures, with one exception, it was necessary to check the levels at the station with the bench mark at least once a year. During the winter the height of the tide could only be observed by means of a floating scale, in the protection of the gauge house. This careful levelling during many years is now bearing fruit in providing a basis for precise levels throughout the country, where they connect with the sea-coast on the Atlantic or Pacific.

The value of mean sea level at any of the tidal stations is found in the first place for a period of one continuous year at a time. It is based upon the height of the tide for every hour, day and night, taken from the records obtained with the registering tide gauge; and the value for each year is thus the average of 8,760 individual measurements. When any interruption occurs, a fresh beginning is made. The values obtained from three or more such years may be considered as highly accurate. The series of levels at the tidal stations serves also to define the low water datum of the charts, and the zero of the tide tables.

The value of mean sea level at Halifax as determined from observations during nine years, has been adopted by the Public Works Department as a basis for their extended levels. The other end of the primary line connects with mean sea level at Father Point, determined from observations during ten years. There is thus a line of levels from Nova Scotia to the St. Lawrence, across three provinces, accurately checked at both ends by the mean level of the sea. From this line, the levels extend along the St. Lawrence to Quebec and Montreal, and westward.

At the request of the Dominion Observatory, mean sea levels at Halifax and Yarmouth were supplied for the two ends of a line of precise levels between those cities, through southwest Nova Scotia. The value of mean sea level at Yarmouth was worked out from one complete year of observations, which were reduced for the purpose with relation to a bench mark established in Yarmouth by this Survey.

In British Columbia a committee on standard datum has under consideration the adoption of a general plan of reference for levels in the province. It is evident that mean sea level is the best basis for such a datum. It is also clear that for various points along the coast or at the heads of inlets, which may become railway terminals, the determination of mean sea level will furnish a more



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accurate elevation than could be determined by means of land lines from one point on the coast to another, through so mountainous a country. At the request of the chairman of this committee, the value of mean sea level was supplied for Vancouver from seven complete years of tidal observations; for New Westminster from six years; and for Victoria from five years. There are no levels north of San Francisco which have so high an accuracy.

The levels from Victoria can be extended throughout Vancouver island and they may be eventually connected with tidal stations which have been in operation for a series of years on the west coast and at the northern end of the island. The value of mean sea level at Victoria has already been utilized by the Geological Survey for their contoured map of the southern end of Vancouver island.

Mean sea level at Vancouver was also furnished to the Dominion Observatory at their request, for precise levels in that region. The tide levels in Vancouver were originally referred to a Canadian Pacific Railway bench mark on the station building; by which the low water datum of the chart, as well as the railway levels, were defined. Before the station building was demolished, reference marks were established on masonry buildings, by this Survey, to preserve these invaluable levels. A new bench mark was also placed by the C.P.R. engineers at the suggestion of this Survey. The accurate value of mean sea level, as determined from seven complete years of observations at Vancouver, has thus been preserved.

At the request of the Topographical Surveys Branch of the Interior Department, mean sea levels at Vancouver and Prince Rupert were furnished, with which they propose to connect their interior levels on reaching the coast. At Prince Rupert, much difficulty has been experienced in maintaining the tide levels with accuracy; as bench marks were frequently destroyed on account of changes due to new construction. Some periods of tidal observations there have been lost on this account or because of other interruptions; but since 1906 four complete years of record have been secured for the determination of mean sea level. From the beginning, the tide levels have been kept in relation with the original harbour datum; and the datum for the chart more recently established, is the same as the zero level in the tide tables. The maintenance of these levels is a satisfactory achievement in the circumstances.

The tide levels at Vancouver have proved of service to the Burrard Peninsula Joint Sewerage Board. For their purpose, the levels were reduced to the C.P.R. datum and the Vancouver city datum.

Information regarding all the bench marks established by this Survey on the mainland around the Gulf of St. Lawrence, has been supplied to the Public Works Department for the revised edition of their geodetic levels now in preparation. This includes a series along the north shore of the Gulf, the lower St. Lawrence and the maritime provinces. The low water datum and other tide levels are given with reference to these wherever they have been determined; and also the valuable tide levels at the head of the Bay of Fundy, from the days of the Baie Verte Canal, which have been preserved by this Survey. Good observations were obtained there as far back as 1870, and later by the engineers of the Chignecto Marine Railway. A bench mark was established in 1901 to preserve these levels, which now enables them to be connected with the new bench marks of the Geodetic Survey. The levels thus established are invaluable with reference to the flooding of the dyked marshes in this region, as the levels reached by exceptionally high tides during recent years have been determined with reference to these permanent marks.

During the tidal observations of last season, along the coast of New Brunswick, the tide levels were kept in relation with any earlier observations which had been secured; and the Public Works datum for low water was utilized



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wherever it was possible to do so. This will make the tidal observations more serviceable for construction purposes in the various harbours where they have been obtained.

### PUBLICATIONS.

The tidal information for Canada is published in two sets of tide tables; one for the eastern coasts for which 8,000 are now provided, and the other for the Pacific coast amounting to 10,000. For Eastern Canada two abridged editions are issued of pocket size, one for Quebec and the St. Lawrence, and the other for St. John, N.B., and the Bay of Fundy. These abridged editions are much appreciated as they are used by all classes, from pilots to fishermen. The total edition of these now amounts to 15,000.

In British Columbia there is a large demand for local tide tables for Vancouver and the Fraser river, and the region extending thence to Victoria. To meet this, it was decided to issue a pocket edition containing the tide tables and the time of slack water in two of the passes. These were First narrows, at the entrance to Vancouver harbour, and Active pass. The edition of 6,000 which was issued for the present year has been increased to 9,000 for the coming year. This pocket edition is much appreciated by the pilots and fishermen, and is often found to be very convenient for motor launches.

The tide tables are supplied without charge to all the steamship companies, and they are largely circulated through the agencies of the Marine Department, shipping masters and customs officers. They are also sent free on request to all applicants. It results that a large proportion of the tide tables are mailed individually from our mailing lists or in reply to requests received. It is interesting to find that many manufacturing establishments and other industries on the coast have constant use for them in addition to the shipping interests. The tide tables for British Columbia are highly valued by the lumbering industry, as it is essential to know the time of slack water in the passes leading to lumbering districts, in connection with the towing of rafts and booms of logs.

The tide tables for the more important harbours in Eastern Canada and on the Pacific coast, eight in all, are now republished by the British Admiralty, and with these they now give tidal differences for a large number of our seaports. Tidal information for the St. Lawrence is also furnished to the Department of Marine and Fisheries for their publication on the St. Lawrence Ship Channel for the use of pilots. The information thus furnished has now been modified in order to give, in the space available, fuller information from Lake St. Peter to the Traverse. For the estuary of the St. Lawrence below there, the complete tables issued by this Survey are referred to. It is hoped that this modification will be more helpful to those requiring local information in the region above and below Quebec. Some of our tide tables are included in two leading almanacs in Canada; and in these various ways the information attains a very wide circulation, and should reach all who require it.

### STAFF.

The staff of this Survey, for the office and field work, comprises only four in addition to the superintendent; together with the outside tidal observers, who number six in Eastern Canada and five on the Pacific coast, at the permanent stations. In addition to this, several others are usually employed locally in the summer season in the observation of tides and currents; and there are engineers on other Surveys who give their co-operation. On the permanent staff, Mr. S. C. Hayden has supervised the observations of the currents in the passes of British Columbia and has inspected the tidal stations on that coast.



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Mr. H. W. Jones has carried out the construction work at St. John already referred to, and has supervised the erection of several summer stations on the New Brunswick coast, and in Northumberland strait. The other assistants are Mr. R. B. Lee, and Miss N. R. Carter, stenographer. In addition to the outside work in the summer season, this staff carries on in the winter, the reduction of the observations and the calculation of tide tables, as well as the ordinary office work and correspondence.

I have the honour to be, sir,

Your obedient servant,

W. BELL DAWSON,

*Superintendent of Tidal Surveys.*



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## HYDROGRAPHIC SURVEY.

OTTAWA, July 6, 1915.

Deputy Minister,  
Department of Naval Service,  
Ottawa.

SIR,—I have the honour to submit my report upon the work of the Hydrographic Survey for the fiscal year 1914–1915.

During the year no additional equipment was added to that of the survey but what we had has been kept in first-class condition.

Owing to the outbreak of hostilities in Europe, it was found necessary for the examination service connected with the department, to take over the steamer *Cartier*, of the St. Lawrence River Survey, early in August, and on this account the amount of work done was curtailed. Further loss was sustained by several officers entering the service of the Admiralty, the War Office and the Canadian overseas contingents.

The following parties were in the field during the season:

1st. Hudson bay party, working between Port Nelson and James bay, as well as making surveys of some harbours in Hudson Straits.

2nd. Pacific coast party working along the coast and islands of British Columbia

3rd. Lower St. Lawrence river party, working in the Lower St. Lawrence about Matane.

4th. Lake Ontario party, working in the west end of the Lake, between Toronto and Niagara river.

5th. Lake Superior party, working between Jackfish bay and Otter head.

6th. James bay party, working in the southeast corner of the bay.

7th. Party looking after the automatic gauges in the Great Lakes and St. Lawrence river.

## HUDSON BAY PARTY.

As in previous years, this party was in charge of Captain F. Anderson, using the steamer *Acadia*. As his experiences and his report upon the conditions pertaining in that part of the world are of considerable interest to the country in general, his report is given in detail (Appendix I), both to show the amount of work done and also to convey some idea of the hardships to be encountered both in surveying that remote region and in navigating Hudson straits.

The steamer left Halifax on the 11th of July, and Belle Isle was cleared on the 15th when ice was encountered for the first time, but by shaping a course well off the land, the icefields were cleared until the 19th. When about 90 miles southeast of Cape Chidley, heavy winter and Arctic ice was encountered, and this condition continued until about 31st July, when the ice opened up. As it was intended to do some surveying around the entrance to Hudson straits, it was not possible to get ashore until 12th August, when a landing was effected on the Lower Savage island, and survey work on various islands in the straits continued until the 10th September, when the vessel left for Port Nelson.

Work was taken up along the south shore of Hudson bay, as far east as Cape Henrietta Maria. On 8th October, the party left Port Nelson for Hudson strait, arriving off Mansel island on the 11th in very cold weather. A survey



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was made of its southeastern shore, and on the 14th, whilst passing from the north end of the island to Diggs island, ice was encountered, and the steamer was forced to heave to in closely-packed heavy Fox channel ice, where she was held all next day, getting cleared about 7 p.m. on the 15th.

Considerable surveying in the way of coast-line and sounding was done in the next few days in the strait, and on 2nd November the steamer cleared the strait for home, arriving at Halifax on the morning of the 10th.

It will be seen upon the perusal of the report that ice was first encountered on 19th July, when it was so bad that the *Acadia* suffered some damage to her rudder, and the vessel was still bothered by ice as late as 12th August, when the party was able to make its first landing. On the way out, she was completely surrounded on the 14th of October.

Admitting that it is possible that she might have avoided the ice in both instances, the report shows that it was a danger that any vessel entering the bay might have encountered, and vessels reaching the vicinity of these ice-fields, are quite unable to keep clear because the ice does not remain stationary but moves quite rapidly with the very strong tidal currents experienced in the strait.

Further, to show the seriousness of this ice condition, I might state that, as a result of her contact with the ice, the *Acadia* sustained damage to the extent of \$25,000.

As a result of the season's work, some improvements will be made to the chart of Hudson bay, and plans were made of the following harbours, which are being engraved for future use:

Charles inlet.

Savage harbour.

Acadia cove.

During the season, this party traversed from the ship, launch, gigs and on foot, 400 miles and checked up some 300 miles more. They sounded from the ship and gigs, 900 miles, and made observations for latitude, longitude and azimuth at 10 points.

## PACIFIC COAST SURVEY.

This party was in command of Lieutenant-Commander P. C. Musgrave, R. N., and he had as assistants Lieutenant John Knight, R. N., retired, Messrs. L. R. Davies, J. A. Turner and O. Parker.

This party worked from the steamer *Lillooet* and the schooner *Naden*, both of which were commissioned at Esquimalt on 15th April, the latter in charge of Lieutenant Knight.

After coaling at Nanaimo, the first work undertaken was the location of the wharves and the wireless station at Alert bay, afterward proceeding to the examination of Dall Patch, Seaforth channel.

The Skeena river was reached on the 29th of April, and Mr. Knight, with the schooner *Naden*, detached to make a survey of that portion of the river, eastward of De Horsey island, as far as Tyee on the Grand Trunk Pacific. This was completed on the 11th July, when the party was moved to Laredo channel for work there and in the approaches to Surf inlet. This work was completed on 19th September.

On the outbreak of war Lieut. Knight left the *Naden* and proceeded to Esquimalt to join the *Rainbow*, and is still in that service. Mr. Turner, being a graduate of the Royal Military College, also felt it his duty to volunteer for service in Europe, and joined the first Canadian expeditionary force, thus seriously reducing the staff. Upon Mr. Knight's retirement, or from about the middle of August, Mr. Davies was put in charge of the schooner.



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Upon the completion of the work at Laredo channel, the schooner was moved back to Inverness, at the mouth of Skeena river, to complete the survey work of the north Skeena passage to connect the survey work of 1907 with that performed by Mr. Knight in 1914.

The main party, after leaving the *Naden* at Claxton, proceeded north to Naas river, where the positions of all the canneries were located and the Bar sounded out. An unsuccessful search for the rock on which the *Vadso* was reported to have been wrecked was made.

Granby bay was reached on 7th May, and a survey made between that date and the 13th.

Between the latter date and the 29th October, the main party was engaged in work in Dixon entrance and around Queen Charlotte islands. The party reached Esquimalt on 2nd November and the ships were immediately paid off.

The work of drawing the fair sheets for the engravers was immediately taken in hand in the offices in the dockyard.

During the season 81 miles of coast line were traversed, and 205 square miles of sounding done.

Out of a total of 169 working days, 66 were lost through bad weather, 33 of them being rain.

The following charts and plans were completed this season:—

Skeena river, Telegraph passage to Raspberry island, on a scale of 3" to the mile;

Skeena river, north Skeena passage, Dominion cannery to Clara Point, on a scale of 3" to the mile;

Laredo channel, northern portion, and approaches to Surf inlet, on a scale of 1" to the mile;

Port Louis and approaches, on a scale of 4" to the mile;

Fisherman cove, Ursula channel, on a scale of 6" to the mile;

Soundings at entrance of Dixon entrance, on a scale of 1" to the mile;

Soundings in northern portion of Hecate strait, on a scale of 1" to the mile;

Soundings on Bar of Naas river, etc.

No extraordinary expenses were incurred in connection with the maintenance of the equipment of this survey. The vessels received the usual overhauling necessary to keep them in first class condition.

#### LAKE ONTARIO PARTY.

This party, with the steamer *Bayfield*, in charge of Mr. G. A. Bachand, having for assistants Messrs. J. U. Beauchemin, E. B. McColl and W. K. Willis, left their headquarters at Prescott on 30th April and proceeded to the west end of Lake Ontario where work was carried out between Toronto and the mouth of Niagara river. Although this area was taken in hand, it was not possible to complete it entirely, but it will be early in the season of 1915.

A survey on a scale of 6" to the mile was made of the Niagara bar, showing that the silt from the river has created quite a new condition over that existing at the time of the last survey by the United States corps of engineers. A plan of this has been prepared and submitted to the engravers for publication. Surveys were also made of the approaches to the Burlington canal, Bronte Harbour and Port Credit.

No new shoals were discovered during the season.

The work performed consisted of 48 miles of traversing, 830 miles of sounding from boats, and 1,000 miles sounding from the deck of the ship, extending over an area of 530 square miles.



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The ship returned to the headquarters at Prescott on 30th October. She sustained no damage during the season and no extensive work was carried out on her, except that her hull was very carefully cleaned by sand blasting inside and paint remover outside, so that at the present time it is in fair shape.

On the whole, this party was more fortunate than in the season of 1913. The weather was a great improvement, there being less rain and less thick weather, which may possibly be accounted for by the fact that she was further from the Toronto smoke.

## LOWER ST. LAWRENCE RIVER PARTY.

This party, with the steamer *Cartier*, was in charge of Mr. Charles Savary, having for his assistants Messrs. A. J. Pinet, Edward Ghysens, M. A. McKinnon and H. T. Bate. The latter, however, left to join the *Niobe* upon the outbreak of hostilities in Europe.

The party left Quebec on 9th May and worked between Sandy bay, on the south shore, and Pointe à Paradis, on the north shore, but a comparatively small amount of work was done, amounting to 25 miles of traversing, 300 miles of sounding from boats, and 350 miles from the deck of the ship.

Upon the outbreak of hostilities the ship was sent for examination service at Quebec, where she arrived on 10th August, but it was loaned to us again for a short period between the 7th and the end of October to get some necessary triangulation in order that the party might be kept busy during the winter.

The work in this district has now been completed along the south shore as far east as Matane, and along the north shore as far as Pointe des Monts. The chart of the former work will be given to the printer this summer, and, it is hoped, a new chart issued at the opening of navigation of 1916.

The steamer has also received the usual overhauling, but she is in very excellent condition.

## LAKE SUPERIOR PARTY.

This party, with the steamer *La Canadienne*, and in command of Mr. H. D. Parizeau, left Owen Sound on 6th May, having for assistants Messrs. H. H. Lawson, F. R. Mortimer and H. L. Leadman, but the former took sick from pneumonia almost immediately after reaching Lake Superior and was invalided during the balance of the season. Shortly after his return to duty in the autumn, he joined the second overseas contingent and has left for Europe. His place was taken temporarily by Mr. McKinnon, of Mr. Savary's staff.

Work on Lake Superior was carried on between Pic island and Otter head, on a scale of  $1\frac{1}{2}$ " to the nautical mile, with plans of Peninsula harbour and Port Munro on a scale of 6" to the mile. This plan has been submitted to the engraver for publication.

An attempt was made to connect the triangulation of this portion of the lake with that of the United States corps of engineers at station Tip-top, but so far weather conditions have hindered Mr. Parizeau getting the long sights necessary.

On 17th September it was deemed advisable to move the steamer and party into more sheltered water, and they reached Little Current on the 19th, where some re-surveying was found to be necessary. On 1st October the party reached Byng inlet, and immediately started the preparation of a large scale plan of that harbour and approaches. Owing to bad weather, however, it was impossible to complete this, although the party remained there until the 8th November. It is hoped to have this completed early in 1915.



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During the season the party traversed 135 miles of shore line, did 500 miles of sounding from boats, and 125 miles from the deck of the ship.

I regret to say that during the season, the party experienced a great deal of thick weather through fog and forest fires on Lake Superior. The party reached Owen Sound on 8th of November, and the vessel was immediately laid up.

*La Canadienne*, although a very old boat, had no heavy expenditures made upon her. She is in fairly good condition, but owing to her small power and poor speed has to be carefully watched in heavy weather.

#### JAMES BAY PARTY.

This party, in charge of Mr. Paul Jobin and assisted by Messrs R. J. Fraser, R. T. Bowes and eight men, left Cochrane on 24th May and arrived at Moose Factory on the 29th.

The next month was spent in fitting out the launch and the chartered schooner *Annie E. Geede*, which proved to be of no use except as a houseboat.

An examination was made of the shore in the vicinity of Mount Sherrick with a view to finding a suitable locality for a harbour, and I am glad to say it offers quite an excellent location.

Surveys were made of the Charlton and Strutton group of islands and of Strutton harbour.

The triangulation of the previous season was carried as far as the east end of Trodeley island, and a better determination was made of the position of Lisbon shoal.

On the 18th September, the party returned to Moose river and continued the survey of that water as far north as the North Bluff beacon.

On 13th October the party left Moose Factory and arrived at Cochrane on the 21st.

The break up, in both the Rupert and the Moose rivers, was quiet.

On the 6th of June ice could still be seen off the mouth of the Moose river, but generally speaking the season was open; the SS. *Adventure* came into Strutton on the 19th of August, having seen no ice after leaving Port Harrison on the 14th of August.

No temperature record was kept because the only thermometer we had was accidentally broken, but the summer was appreciably warmer than the preceding two; there was little bad weather, but the draught and the prevailing south winds were responsible for a great deal of hazy and smoky weather which interfered greatly with sounding and triangulation.

#### AUTOMATIC GAUGE PARTY.

These gauges are looked after by Mr. C. A. Price, who had for assistants during the year Messrs C. Smith, W. J. Miller and A. R. Lee, but upon the opening of hostilities in Europe, Mr. Miller joined the first overseas contingent and left the office early in August.

The investigation into the levels of the St. Lawrence river being still in hand, guages were maintained at the following places for the season of navigation:

- Foot of Lachine canal.
- Longue Pointe.
- Verchères.
- Varennnes.
- Lanoraie.
- Sorel.



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Lighthouse in Lake St. Peter. .  
 Three Rivers.  
 Batiscan.  
 Pointe Platon.  
 Neuville.  
 St. Nicholas.  
 St. Romuald.

On the Great Lakes, the usual gauges were maintained at Kingston, Port Dalhousie, Port Colborne, Fighting island (Detroit river), Ile aux Pêches (Detroit river), Goderich, Soo canal (both above and below the lock), and Port Arthur.

With the exception of the gauges at Collingwood, Goderich and Port Dalhousie, the lake gauges are maintained during the whole year and give complete yearly records.

During the season of 1915, it was intended to increase the number of gauges by placing one in Lake St. Louis and a new one at Michipicoten in Lake Superior in accordance with the request of the International Joint Commission to furnish data for the proper handling of the new sluice gates at Sault Ste. Marie.

Attached are the following appendices, giving records obtained from the gauges:—

- III. Table of water levels of the Great Lakes, 1914.
- IV. Description of bench-marks established by automatic gauges and elevations thereof determined by water surface transfer and by precise levelling (instrumental).
- V. Table showing yearly water surface transfer and elevations of bench-marks.
- VI. Daily mean elevations of St. Lawrence river at Montreal.
- VII. “ “ “ “ Longue Pointe.
- VIII. “ “ “ “ Varennes.
- IX. “ “ “ “ Verchères.
- X. “ “ “ “ Lanoraie.
- XI. “ “ “ “ Sorel.
- XII. “ “ “ “ Lake St. Peter.

*List of New Charts.*

The following new charts were issued during the year:

- No. 52, Lake St. Francis, Coteau Landing to Lancaster.
- 406, Cape Tatnam to Port Nelson.
- 105, Jackfish bay.

The following new editions were issued:

- No. 10, Foot of Lake St. Peter.
- No. 1, Montreal to Longue Pointe.
- No. 14, Batiscan to Cap Levrard.
- No. 7A, Berthierville to Lake St. Peter.
- No. 302, Digby island to Kennedy island (Chatham sound).
- No. 301, Prince Rupert harbour.
- No. 12, Becancour to Champlain.
- No. 3, Ile à l'Aigle to Ile Marie.
- No. 4, Ile Marie to foot of Ile Bouchard.
- No. 5, Ile Bouchard to Ile St. Ours.
- No. 11, Three Rivers to Becancour.
- No. 15, Cap Levrard to Ste. Emmelie.



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During the season the new edition of the St. Lawrence Pilot below Quebec was issued to the public, and the "Georgian Bay and North Channel Pilot" was combined with the "Sailing Directions of the Canadian shores of Lake Huron" by Captain Boulton, R.N., retired, and issued to the public at the close of the year. These two works are quite valuable and the demand for them is very great.

In closing this report I have to thank the various members of the staff for the valuable service they have rendered during the past year, and all are using their best endeavour to follow the interest of the work they have in hand.

I have the honour to be, sir,

Your obedient servant,

WM. J. STEWART,  
*Hydrographer.*



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## APPENDIX I.

OTTAWA, 6th April, 1915.

The Chief Hydrographer,  
Department of Naval Service,  
Ottawa.

SIR,—I beg to submit the following report on the survey work carried out during the past season in Hudson bay and strait, with an account of the passage to and from the bay, paying particular attention to the ice conditions.

The steamer *Acadia* was again employed for this expedition. Although many of her steel plates had been considerably dented in the ice leaving Hudson bay during the autumn of 1913, extensive repairs were not required, leaking rivets and minor matters only receiving attention.

Before proceeding north, a preliminary trip was taken to Lockeport, on the southeast coast of Nova Scotia and about one hundred miles southwest from Halifax, to search for an uncharted rock, reported in the entrance to the harbour. Halifax was cleared at 6 p.m. on the 6th July, arriving off Lockeport at 7 next morning. The weather being foggy, with considerable wind and sea from the southeast, shelter was taken in the entrance to Shelburne harbour. On the following morning, the fog having lifted, the ship moved to Lockeport and anchored off Laurier rock gas buoy. A shoal with  $2\frac{1}{4}$  fathoms least water over it was discovered about 75 yards west of the gas buoy, with deep water about it. Nothing further was found in the immediate vicinity, and as considerable sea was running, a more careful examination was impossible.

Shortly after clearing the entrance to the harbour, the ship struck an unknown rock in mid-channel about  $1\frac{1}{4}$  miles northeast off Gull lighthouse. This shoal was found to have only 11 feet of water over it, and it is remarkable that it had not given trouble earlier, as ships entering and leaving must have passed close by it.

Halifax was again reached at 8 a.m. on Thursday, the 9th, and final arrangements completed before departing for the north.

The ship's company consisted of the following:—

Captain F. Anderson.....	In command.
Captain W. A. Robson.....	Sailing Master and Pilot.
Lieut. C. B. Shaw, R.N.....	Surveyor.
Mr. L. C. Prittie.....	“
Mr. J. L. Foreman.....	“
Mr. C. B. R. MacDonald.....	“
Mr. J. E. MacDonald.....	1st Officer.
Mr. Alfred Langlois.....	2nd “
Mr. J. S. Dickson, M.D.....	Physician and Surgeon.
Mr. J. C. Kelly.....	Chief Engineer.
Mr. Clifford Crease.....	2nd “
Mr. Jas. Pace.....	3rd “
Mr. C. W. Browne.....	Wireless Operator.

with Quartermasters, Seamen, Firemen and Stewards, a total of 51 persons on board.



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Halifax harbour was cleared on the morning of the 11th of July and course laid to the eastward along the coast of Nova Scotia, arriving at North Sydney next morning. Time signals were received at the Western Union cable station from St. John at 2 p.m. for rating the chronometers.

Easterly wind accompanied by heavy fog and rain prevailed. On the following morning, time was again obtained, and being the last port of call, all mail was landed and the harbour cleared at 3 p.m. With the wind fresh from the north, a speed of  $7\frac{1}{2}$  knots was maintained against the head sea, and Belle Isle was reached at 6 p.m. on Wednesday, the 15th. On the trip up no ice had been seen, but after passing Belle Isle, many fields were met with. Course was shaped to pass through the thinnest, to carry us well off shore, and all ice was cleared about mid-night.

Wireless reports were sent to Ottawa before losing connection with Belle Isle, and this proved to be our last connection with the shore, because to clear the ice pack it was necessary to hold well off shore, beyond the range of the low powered stations on the Labrador coast.

After clearing the ice about Belle Isle, the course followed was from 75 to 100 miles off shore and little or no ice was seen until we hauled in for Cape Chidley, on Sunday the 19th. At 3 a.m. light winter ice was entered and passed through without difficulty until 7 a.m., when about 90 miles southeast from Cape Chidley and 60 miles off shore, heavy winter and Arctic ice was entered, making progress slow and hazardous. Later in the day, the rudder received damage by coming in contact with a large pan while "backing up" and the ship was hove to for repairs. It was found that the rudder stock had been twisted, necessitating the removal of the quadrant and cutting a new key slot. This operation took the remainder of the day and the night.

The ice fields appeared very extensive, no open water being visible from the mast-head. The steamer *Bonaventure*, chartered by the Department of Railways and Canals for carrying supplies to the Hudson Bay terminus at Port Nelson, was picked up by wireless and reported that she was icebound about 25 miles southeast of the Button islands, that no open water was visible, and conditions had been much the same since the 9th, when she first appeared upon the scene. On the following morning, Monday, 20th, a move was attempted, but with little success, as it was not safe to try and force a passage in such heavy ice and so closely packed.

We made fast to a large pan and filled up the fresh water tanks from pools on the ice. During this operation, tests of the water had to be frequently made as it was found that, though perfectly fresh on the surface, it might be quite salt a little below.

The steamer *Bonaventure* reported that they were doing likewise, also that the crew were playing football on the ice pack.

From this date until the 30th of the month, the ship was more or less hemmed in by the ice pack, which apparently extended to the land. Though able to make an occasional move of a few miles, there was little gained as the southerly Arctic current would carry the ship back again. The general position was about 40 miles off shore and 60 miles S.E. of Cape Chidley. During a gale from the south-east, considerable swell entered the ice pack and made a very uncomfortable berth with huge pans of ice bumping and scraping against the sides of the ship. However, we finally succeeded in securing the ship to a large pan in such a way as to afford protection to the propellor and rudder.

Although no serious mishap took place, minor damages were received. A leak developed in the forepeak tank, necessitating pumping out frequently, and the shell plates were much dented, especially at the turn of the bow, breaking connection inside and causing leaks, but we were lucky enough to get them stopped up. Daily communication was kept up with the steamer *Bonaventure* in case of accident and for ice reports.



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The weather on the whole was fine, though very foggy, occasional rain and constant easterly wind tending to hold the ice pack together until 31st of July, when a moderate gale came down from the northwest, opening up the ice pack and improving conditions. Had it been our intention to pass directly through the strait and enter Hudson bay, it could have been accomplished without any more difficulty or damage than from remaining in this locality, but considerable work had been done and the great difficulty was to secure a landing or a harbour. About this time the steamer *Minto* and schooner *Burleigh* were reported.

On 1st August the ship was swung for compass error, care being taken to dodge the ice. Next day an attempt was made to make the Button islands, but we were obliged to heave to about 20 miles off. The steamer *Adventure*, carrying supplies for the Revillon Frères fur trading posts, appeared on the scene and was held fast for some hours but managed to push through on the change of tide. Later in the day we approached the Buttons but found the passage to the anchorage completely blocked by ice. When about two miles to the northeast of the islands, the ship was caught in heavy flood tide rips and completely hemmed in by heavy pans continually opening and closing and whirling about. We again sought safety by securing to a large pan, affording protection to the propellor and rudder. It was clearly seen that the Button islands should receive a wide berth in the presence of ice.

On the following day, the steamers *Bonaventure* and *Sheba* reported about 120 miles off, accompanied by the tug *Yates* with two steam barges in tow. They were advised to hold towards the north shore and Resolution island.

On Friday, 7th August, we had a moderate gale from the southeast, accompanied by rain, and although Resolution island was reached, weather conditions prevented our hunting for a harbour. As appearances indicated easterly weather for some days, an attempt was made to enter Port Burwell, but this had to be abandoned, as the ice off the southside was found much heavier, more formidable and packed more closely, especially on the flood tide. The weather was disagreeable in the extreme, rainy and foggy for the most part with much heavy ice about, and the ship was carried back and forth with each tide. Another attempt was made to land on Resolution island on Wednesday the 12th August, but the coast was found completely ice bound and any harbour inaccessible.

On the following morning a landing was effected on the southeast part of Lower Savage island to take observations. Later, having discovered a small harbour in the northeastern part of the island, the ship came to in the evening. This was the first time we had cast anchor since leaving Sydney, and needless to say it was a great relief after so many days drifting about.

Savage island harbour, situated in the northeast part of the island affords good shelter from all winds. Limited anchorage is available over an area of about half-a-mile long and one-quarter of a mile across with a depth of 22 fathoms over mud bottom.

Observations were taken for latitude and longitude and azimuth on an island in the south part of the harbour, which was sketched and sounded out. The whole island was later sketched from the launch and soundings taken. A narrow boat channel cutting the island in two connects the harbour with the south side.

Lower Savage island is quite different from that shown on Canadian Chart No. 405. It lies with its southeast point N 57° E about 16 miles from the position shown. It is almost an equilateral triangle in shape with sides of about 8 miles; quite bare-like the surrounding country and from 200 to 800 feet in height. It is separated from the southeast part of Baffin Land by a strait about 3½ miles in width and of some 125 fathoms deep.



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The flood and ebb tides sweep through at about 4 or 5 knots, causing heavy tide rips.

The southeast part of Baffin Land about East Bluff is about 10 miles to the northeastward of that shown on the chart. Very little snow or ice was found on the rocks in this locality.

Near midnight, on the 16th, the steamer *Sheba*, picked up by wireless half way across Hudson bay, over 600 miles away, reported no ice about.

On the morning of the 17th, we left Savage harbour at 5 a.m. bound for Hatton headland at the southeast part of Resolution island. We passed through much drift ice without difficulty as it was honeycombed and soft.

A small harbour was discovered just north of the west point of Hatton headland, where the ship came to anchor at 3 p.m. This harbour called "Acadia anchorage" is formed by a number of islands, giving good shelter from all winds in 20 fathoms of water over an area of about one-tenth of a square mile. Shore observations were taken in the northeast corner of the harbour for latitude and longitude and azimuth. The harbour and vicinity were sketched and soundings taken. A suitable site for a wireless station is available on a hill in the northeast part of the harbour and about  $\frac{1}{3}$  mile back from the shore line with convenient gullies leading to the base of the hill.

On Wednesday, the 19th, the first news of the European war was received by wireless from the steamer *Sharon*, having just arrived from Halifax.

Hatton headland was found to be S.  $64^{\circ}$  E. about 8 miles from the position shown on the charts.

Strong tidal currents of from 4 to 5 knots an hour and heavy tide rips were found in this locality.

The C.G.S. *Minto* reported the safe arrival at Port Burwell of the schooner *Effie M. Morrissay* with coal for us. This was welcome news, because owing to the ice conditions grave fears had been entertained for her safety. It was learned later that this little auxiliary schooner had had a very hard trip up along the Labrador coast, and a very narrow escape from disaster while rounding Cape Chidley. The strong tidal currents swept her through the passages behind the islands at the point at great speed, but although very near the rocks at times she escaped serious injury.

On Friday, the 21st, with easterly wind and rain, the anchorage was cleared at 9 a.m. for the Button islands about 40 miles distant. The course laid off proved good, and the islands were picked up when about a couple of miles ahead and Port Burwell reached at 7.30 p.m.

During the passage we encountered many fields of ice, but being neither heavy nor closely packed, they gave little trouble.

It was particularly noticeable that a fog bank hung about the entrance to the strait between Button islands and Hatton headland, but did not extend any distance inside this line and it was comparatively clear about Port Burwell. This condition lasted for some days, the fog bank being clearly seen about the islands from the highland.

In Port Burwell harbour were found the C.G.S. *Minto*, *Effie M. Morrissay*, auxiliary schooner *George B. Cluett* of the Carnegie Institute of Terrestrial Magnetism of Washington, and a Hudsons Bay Company schooner from Fort Chino, Ungava bay. The following day, with rain and generally disagreeable, was occupied coaling from the *Morrissay*.

On Sunday, Mr. Peters, officer in charge, and staff of the *George B. Cluett*, dined on board the *Acadia*.

A message was received from Ottawa via Port Nelson and steamer *Bonaventure*, passing out bound for Halifax, and reports were sent by her.

On Monday, the 24th, much the same weather, coaling was proceeded with and finished in the evening. Examination made about the harbour and vicinity



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for a suitable coaling station, revealed nothing very satisfactory, but sufficient information has been obtained of the best place in sight, near the observation spot, to prepare plans if required.

We cleared Port Burwell at 5 a.m. on the following morning, the 25th, the weather showing little improvement, for Charles island, maintaining a speed of 8.5 knots on a consumption of 10 tons of coal in 24 hours.

On Thursday morning the ship was brought to anchor in a small inlet formed by a narrow island off the south side of Charles island, in 15 fathoms of water over sand bottom. Good shelter can be found here from most winds, except an easterly gale, when considerable swell would likely enter. The anchorage space, in from 10 to 18 fathoms of water, extends over an area of about a mile east and west, and  $1\frac{1}{2}$  to 3 cables in width.

Observations were taken for latitude and longitude and azimuth. Charles island and Cape Weggs were sketched from the launch, soundings taken and the former connected up to the latter by triangulation. The water was found to be very deep off the Cape, but good anchorage and shelter from southeast winds, in from 10 to 15 fathoms over sand bottom, can be had just west of it.

The east end of Charles island was found to be correct in latitude, but lies eight miles further to the westward, and the west end is N. 60 W. distant, 14 miles from the position shown on the chart.

The island is 22 miles long west by north and east by south and 5 miles across at the widest part towards the east end. It is devoid of vegetation and no natives live there. The eastern part of the island is high and bold on the north and east sides, rising to a height of from 200 to 600 feet above high water, with deep water close by. To the westward it terminates in a low flat boulder point a couple of feet above high water and fringed with a boulder bank for one-quarter of a mile. Ten fathoms will be found about three-quarters of a mile off.

We left Charles island on Tuesday evening, September 1, arriving off the north end of Mansel island at 3 p.m. on the following afternoon. Fair anchorage was found about 7 cables off the north end of the island in 7 fathoms of water over sand bottom and about 7 cables west of a boulder spit, making off the north point about a mile in a northwesterly direction. Shore operations were at once started for latitude, longitude, azimuth and traversing the north end of the island, but a full gale came down from the north on the 4th, preventing further work in such an exposed locality, and we were forced to let go and run for shelter. As it was intended to visit Cary's Swan Nest point (Coate's island), the ship was headed in that direction, where we arrived at 7.30 p.m. A comfortable berth was found in five fathoms of water over limestone gravel bottom about six miles northwest from Cary's Swan Nest point and three miles off shore.

The shore line was traversed for five miles to the northeastward and 10 miles to the northwestward of the point and soundings taken.

Shore observations were taken for latitude, longitude and azimuth, at a point N. 30 W. about five miles from the extreme of the point on a limestone gravel ridge about 20 feet above high water. The observation spot is about 50 feet back from the edge of the bank, which is steep to a high water mark. Cary's Swan Nest point was found in much the same position as shown on Canadian Chart No. 405. The point is composed of limestone gravel ridges not over 50 feet above high water and having many small fresh water lakes.

The west shore is swampy above high water mark and fringed by a boulder bank, drying at low water for a distance of half a mile until the most southerly part of the point is reached where the boulder bank extends out a couple of miles in a general S.S.W. direction where less than 6 feet of water will be found with the 3-fathom bank half a mile further off, but beyond this the water is good. The eastern shore is much cleaner, the boulder bank extending out only a short distance.



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Plenty of game of all sorts was seen there, i.e. polar bears, deer, Arctic fox, eider duck, swans, also numerous wild flowers.

The weather having moderated, a move was made on Sunday evening, the 6th, arriving again off the north end of Mansel island on the following morning and shore work was at once proceeded with. At 11 p.m. Lieut. C. B. Shaw, of the survey staff, at his request was transferred to the Railways and Canals steamer *Sheba* bound for Halifax, that he might offer his services to the Admiralty. During the next few days the north end of Mansel island was traversed on shore and the west side from the launch, the ship carrying a line of soundings off shore. Observations were taken for latitude, longitude and azimuth at the north point on a limestone gravel ridge about 40 feet above high water and 300 feet inland. Similar observations were also taken at a point on the west side about 25 miles north of the south point of the island. On the return trip later in the season the east shore was traversed from the ship.

Mansel island is about pear shaped, 54 miles long north and south and 28 miles across at the widest part, which is about one-third the length from the north end.

It is formed of limestone gravel ridges which are from 10 to 40 feet in height on the west side and about 100 feet high on the east side. There are no trees of any kind and the game to be found consists chiefly of polar bears.

The most northerly point was found to be in much the same position as shown on Canadian Chart No. 405, but the shore does not turn to the southward as abruptly as shown. From the north point the shore trends in a W.  $10^{\circ}$  S. direction for 10 miles thence S.  $31^{\circ}$  W. for 15 miles. A boulder reef extends about one mile in a northwesterly direction from the north point but a short distance outside this reef the water is good. Shoal water extends for  $1\frac{1}{2}$  miles off the south end of the island and north of this point for about 15 miles on the west side a shoal bank makes out about 5 miles. The remainder of the island can be approached to within  $1\frac{1}{2}$  miles with safety.

Departure was taken from the south end for Port Nelson on Tuesday evening 10th September, arriving off Nelson shoal on Sunday morning the 13th, and a few hours later we came to anchor in the channel at Port Nelson, a couple of miles outside the Hudson bay terminus.

During the trip across the bay, the weather was very disagreeable, fresh easterly winds and heavy seas for the most part, gradually moderating as the west shore was approached. Though foggy and not being able to see more than a couple of miles, by the constant use of the submarine sentry no difficulty was experienced in approaching and picking up Nelson shoal, and then by following along the shore bank the entrance to the river was finally reached.

The air was found to be much clearer in the river than outside. While at Port Nelson, time signals sent out from Arlington, Virginia, were obtained at the wireless station for rating the chronometers.

Oiler Herbert Hillier, who had been reported very ill, was operated on by the ship's surgeon, assisted by Dr. Marcellus from the Hudson bay terminus. The operation was as successful as could be expected considering the condition of the patient and little hope was entertained for his recovery. Port Nelson was cleared at 6.30 a.m. on Thursday the 17th and the ship came to anchor off the Hayes river at 9 a.m. A visit was paid to York Factory to collect some instruments we had been forced to leave behind last autumn by extremely bad weather and ice conditions. The officer-in-charge of the Hudson's Bay Company reported a very severe winter, in fact the worst for years. The ice left Nelson river about the middle of June.

On the following morning, steam was taken at 5 a.m. and Cape Tatnam reached at 9.30, and from this point of departure the coast was traversed



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from the ship, where possible, to Cape Henrietta Maria, a distance of some 300 miles, where we arrived on the 26th. During the trip the weather was on the whole fair and permitted landing at Fort Severn and Winisk for shore observations. At the above point the shore was found to be some 50 miles out in longitude but about correct in latitude as shown on Canadian Chart No. 405.

Observations were taken at Cape Henrietta Maria for latitude, longitude and azimuth. The point was traversed and soundings taken. It was found to be about correct in latitude but 10 miles to the westward in longitude from the position shown on the chart. On the east side the water was found to be good, giving a depth of from 6 to 8 fathoms of water one mile off shore. Shoal water extends off the north point in a N.N.W. direction some 10 miles and a considerable distance to the westward.

This locality was found to be much the same formation as Coates and Mansel islands, limestone gravel ridges about 10 ft. high.

I regret to report the death of Herbert Hillier at 9.20 a.m. on Tuesday, the 29th September. As already stated, little hope was entertained for his recovery at the time of the operation, and everything possible was done to relieve him. He was buried with due ceremony on Cape Henrietta Maria on the following day. Complete reports have already been forwarded concerning this occurrence.

We departed from Cape Henrietta Maria at noon on Saturday, 3rd October, with northeast wind accompanied by snow squalls. A line of soundings was carried to Cape Tatnam, and as the season was getting very late, sounding was carried on all night by arranging lights on deck and the crew working in three watches that no time would be lost. Cape Tatnam was reached at noon on the 5th and Port Nelson at 7.30 p.m.

Time signals were again obtained from Arlington, Virginia, at the wireless station to check the chronometers.

Coal was received from the Department of Railways and Canals coaling barge *Ben Mare*.

Final reports being despatched to Ottawa, Port Nelson was cleared on the morning of the 8th October, during a moderate gale from the northwest accompanied by snow and the thermometer at 16° F.

Sounding was carried on with difficulty owing to the heavy sea running and finally had to be dropped as there was danger of having men washed overboard when backing up to take a cast. We arrived off the south end of Mansel island on Sunday, the 11th, and came to anchor  $1\frac{1}{2}$  miles due east of the south point in 15 fathoms of water over gravel bottom.

The island was well covered with snow and the continual heavy snow storms gave an appearance of winter, the thermometer standing at 16° F.

On the morning of the 13th, a move was made and the east side traversed from the ship and soundings taken. Great difficulty was found in accomplishing the above on account of the frequent heavy snow storms, but the north end was finally reached on Wednesday, the 14th, and we squared away for Diggs islands.

About 3.30 p.m. scattered ice fields were passed through, and by 11 p.m. we were forced to heave to in the closely-packed extremely heavy Fox channel ice. In the morning, the ice having opened on the change of the tide, a move was made and all ice cleared by 7 p.m. about 10 miles past Eric cove, and Charles island was reached at noon on the 16th.

Although the *Acadia* managed to get through this ice without injury, it was quite sufficient to cause serious trouble to any ordinary freight steamer.

On the following day, a fierce gale from the E.N.E. prevailed, accompanied by snow squalls with thermometer at 16° F., preventing any work.



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We cleared Charles inlet on the 18th, carrying a line of soundings from the east point of Charles island, Cape Moses Oates, to Bluff point, Baffin land, inside Lower Savage island, where we arrived on the 19th.

On the following day we sketched the adjacent shore and came to for the night in Savage harbour.

Next day a line of soundings was carried to Resolution island, and the southwest point of the island sketched from the ship. Acadia cove was reached on the 22nd.

On the following morning, a line of soundings was carried to the Button islands, where we came to anchor at 5.30 p.m.

On Tuesday, the 25th, the *Sheba* and *Bellaventure* passed out bound for Halifax and messages were sent to be mailed from the first port of call. On Wednesday, the 28th, a move was made, coming to anchor in the evening at Port Burwell, after attempting to accomplish some work between snow squalls.

The period from October 22nd to November 2nd was employed connecting the Button islands with Cape Chidley by triangulation and also awaiting an opportunity to sketch the latter. This was not an easy task at the time of year, owing to the inclement weather, moderate to heavy gales, accompanied by snow, prevailing—with the thermometer registering 16° F. to 26 °F. Cape Chidley was finally cleared for the season, on Monday, 2nd November, and we arrived at North Sydney on the morning of the 7th. During the trip down we had fresh northerly winds and snow squalls and a few icebergs were seen.

Time signals from St. John were obtained at the Western Union cable station.

Sydney was cleared on Sunday morning, 6th November, but owing to heavy winds encountered outside from the W.S.W. shelter was taken at Louisbourg until the next morning. Halifax was reached on the morning of the 10th.

The crew was paid to date, and those willing to serve were retained on board.

The Survey staff returned to Ottawa to plot the season's work, except Mr. C. B. R. MacDonald, who having obtained permission, left the Survey staff at Halifax and accepted a commission in the British army.

I beg to thank the Survey staff and also the sailing master and first officer of the ship for their close attention to duty during the past season.

I have the honour to remain, sir, .

Your obedient servant,

F. ANDERSON,

*Officer-in-Charge of Hudson Bay Survey.*



## APPENDIX II.

## ICE CONDITIONS IN HUDSON BAY AND STRAIT, SEASON OF 1914.

The Arctic current setting south along the east shore of Baffin land carries great masses of Arctic field ice and icebergs across the eastern entrance to Hudson strait and along the Labrador coast. This generally occurs between last week of November to the first week in January, blocking the entrance to the strait to a greater or less extent until the following July. A certain amount is forced through Gabriel strait and carried to the westward by the current setting west along the north shore. Icebergs have been seen about Nottingham island and Cape Wolstenholm, but as a rule they do not enter Hudson bay. If not grounded, these are carried out again by the current setting east along the south shore of the strait.

When the *Acadia* arrived off Cape Chidley, on the 19th of July, open water was visible from aloft, and the Str. *Bonaventure*, some miles to the northward, reported similar conditions. The ice, for the most part, appeared to be winter ice, probably from Hudson and Ungava bays. Although occasional bergs and arctic ice were seen, the main pack of arctic ice had passed to the southward. "Winter ice" means ice one year old, but "Arctic" or "polar" ice may be two or many years old, and consequently much heavier and harder.

The constant easterly winds held the field ice packed, making further progress impossible until 31st July, when the wind veered to the westward and finally blew a full gale from the N.N.West, opening up the pack. Conditions were not so severe after this date, but until the latter part of August, great fields were continually passing out, part of which returned with the flood tide, partially obstructing the passage.

It was specially noticed that the greater portion of this heavy pack ice drifted towards the south side of the entrance about Cape Chidley and the Button islands, rather than to Resolution island, and, with the strong tidal currents, making it a dangerous locality for any steamer attempting a passage. During the ebb tide the ice pack may become well opened, affording good leads, but on the change of tide it would close up with great pressure in places.

A couple of years ago, a powerful Newfoundland steel sealing steamer was caught and received a very bad nip.

During July, 1913, a small auxiliary schooner, being caught in this locality, received such pressure that oil tanks in her hold were burst. The crew abandoned the ship and took refuge on the ice, but on the change of tide, when the pressure slackened, the ice opened up again, and as the ship appeared still sea-worthy, owing to her staunch construction, the crew returned on board and managed to clear the ice pack before the next tide.

On the other hand, towards the north side of the entrance, about Resolution island, although the tidal currents were found just as strong, the ice appeared lighter and much honeycombed, probably some that had been carried out on the south side by one tide and returned by the next.

Entering with much ice, about the best passage has generally been found close to Hatton headland and along the north shore. Careful note should be taken of the direction of the wind. A fresh south wind would drive the ice to the northward when a mid-channel course would be the better one to take.

As already mentioned, navigation would have been greatly impeded by ice until the end of August for vessels entering the strait from the east, and



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from early in October entering from the west, because Fox channel ice began to appear at the west entrance about the latter date, greatly interfering with vessels.

The *Acadia* leaving Hudson bay on October 15th found the passage between Diggs and Nottingham islands about closed, and was forced to pass the night in the ice pack. On the following morning, the change of tide opened the pack sufficiently to allow passage, and all ice was cleared about ten miles past Eric cove. Cape Chidley was cleared for the season on the 2nd of November with no ice in sight.

During the past season, after the middle of September, snow storms were the order of the day, and this taken in conjunction with the ice condition detailed above, rendered the period during which ordinary tramp steamers could have navigated the strait with safety very limited.

Owing to the great masses of ice to be encountered and the difficulty of finding the best lead, hydroplanes operated in connection with the wireless stations might be used with good results, to inform captains concerning the disposition of the ice and where they may find open leads. These would be particularly useful in the autumn at the passage between Diggs and Nottingham islands. It is submitted that they might be more useful than the seagoing tugs hitherto suggested. The information would be obtained much more quickly with no danger of being caught in the ice. On the other hand there would be the danger of an accident occurring and the crew of the machine being cast away on an ice flow. In the autumn frequent snow storms and heavy winds might hamper the operation of these machines, and in the spring fogs caused by the sun on ice fields would certainly be a drawback.

#### ICE CONDITIONS IN JAMES BAY.

The prevailing northerly winds in Hudson bay during the early summer drive all the field ice to the south end of the bay very effectually closing up the entrance to James bay until the latter part of August or first of September. This ice consists chiefly of *winter ice*, although icebergs and Fox channel ice have been found. During the season of 1912 the powerful steel sealing steamer *Beothic* reported having encountered heavy Fox channel ice and many bergs in this locality about the middle of August, and a period of 8 days was spent in forcing a passage. Strong northerly currents were also reported when abreast Cape Henrietta Maria, making considerable motion in the ice fields that greatly increased the danger. It is quite unusual to find strong currents in this locality, but they were probably caused by a constant northerly wind forcing the water into James bay.

An ordinary tramp steamer would stand a poor chance of escaping injury under similar circumstances, and it would not be well to attempt this region until the latter part of August or early in September. The closing of James bay, for the season, may be taken about the middle of November, as weather conditions are much similar to Hudson bay.

Attached to this report are the following:

Meteorological observations taken on board the *Acadia*.

I am, sir, your obedient servant,

F. ANDERSON,

*Officer in charge Hudson Bay Survey.*



METEOROLOGICAL OBSERVATIONS taken on Board C.G.S. Acadia.

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Date.	BAROMETER.			THERMOMETER.			WIND.			LOCALITY.		Remarks.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Direction.	Force.	Clouds.	Lat. N.	Long. W.	
1914. July 11.....	31.00	30.10	30.55	59F	46F	52.5F	SSE.	1	4	44 28	63-13	Left Halifax at 10 30 a.m.; p.m., fog.
" 12.....	30.10	29.60	29.85	53	49	52.0	SSW.	2	10	North	Sydney...	Fog; p.m., rain
" 13.....	29.60	29.88	29.74	51	49	50.0	NNE.	3	4	North	Sydney...	Left N. Sydney 2.30 p.m.; fog; p.m., clear.
" 14.....	29.90	29.60	29.75	60	47	53.5	SSE.	3	1	28-50	59-20	A.M., clear; p.m., overcast.
" 15.....	29.60	29.96	29.78	51	34	42.5	NNE.	3	0	51-34	56 30	Encountered ice field p.m. Few icebergs.
" 16.....	29.96	29.50	29.73	38	32	35.0	E.	2	2	53-13	53-58	Loose field ice, few icebergs.
" 17.....	29.58	29.40	29.49	39	36	37.5	NNE.	5	5	56-15	55 30	Fog; overcast; few icebergs.
" 18.....	29.80	29.56	29.68	36	30	33.0	NNE.	3	2	58-31	58-26	Overcast, few icebergs.
" 19.....	29.80	30.00	29.90	33	26	29.5	S.	1	0	59-56	61-31	Clear and fine; packed drift ice
" 20.....	30.00	29.86	29.93	46	30	38.0	Calm.	0	0	59-49	61 16	Clear and fine; in packed field ice.
" 21.....	30.24	29.86	30.05	36	28	32.0	E.	2	5	59-55	62-28	Loose field ice, numerous bergs; p.m., clear.
" 22.....	30.24	30.20	30.22	56	30	43.0	Calm.	0	0	59-52	62-29	Clear and fine. Packed heavy ice.
" 23.....	30.18	30.04	30.11	38	30	34.0	SE	1	4	59-54	63-27	Clear; p.m., rain; heavy field ice.
" 24.....	30.04	29.96	30.00	36	30	33.0	SE.	1	10	60-04	63-17	Fog. Few bergs, close field ice
" 25.....	29.96	29.64	29.80	34	30	32.0	E.	2	10	60-10	63-18	Fog. Close packed field ice.
" 26.....	30.02	29.80	29.91	35	31	33.0	NNE.	2	10	60-10	63-18	Fog. Packed winter and polar ice. Icebergs.
" 27.....	30.10	30.02	30.06	52	32	42.0	NNW.	1	4	60 05	62-38	Clear and fine. Fog, packed winter ice.
" 28.....	30.10	29.90	30.00	52	32	42.0	NNW.	2	0	59-50	62-20	Clear and fine. Packed winter and polar ice.
" 29.....	29.90	29.78	29.84	49	33	41.0	WSW.	4	10	59-50	62-30	Rain. Loose to packed winter ice.
" 30.....	29.78	29.62	29.70	48	34	41.0	NNW.	2	10	59-45	62-33	Rain. In packed ice (some polar ice).
" 31.....	29.62	29.64	29.63	44	32	38.0	W.	5	10	59-52	62-52	Rain. In loose winter ice, few icebergs.
Aug. 1	29.64	29.60	29.62	48	34	41.0	W.	2	5	60--24	63 30	Rain. P.M., clear. Scattered field, winter, and polar ice.
" 2	29.64	29.60	29.62	51	32	41.5	SW.	1	0	60-24	64 30	Clear. Loose and packed ice fields. Few bergs.



METEOROLOGICAL OBSERVATIONS taken on Board C.G.S. Acadia—Continued.

Date.	BAROMETER.			THERMOMETER.			WIND.			LOCALITY.		Remarks.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Direction.	Force.	Clouds.	Lat.	Long.	
1914. Aug. 3.....	29.74	29.64	29.69	44	34	39.0	NW.	4	5	Lacey Island (Buttons) 63-52		Fog. P.M., fine and clear. Loose ice.
" 4.....	29.76	29.52	29.64	46	34	40.0	SSW.	4	4	60-38		Clear. P.M., rain; loose and packed field ice.
" 5.....	29.70	29.40	29.55	45	28	36.5	NW.	6	8	60-29	63-32	Rain. Packed fields, winter ice.
" 6.....	30.00	29.70	29.85	46	32	39.0	WNW.	5	6	60-23	62-30	Rain. P.M., clear. Loose winter ice.
" 7.....	30.00	29.60	29.80	40	31	35.5	E.	6	8	61-19	64-50	Fog, overcast; scattered field ice.
" 8.....	29.78	29.60	29.69	34	30	32.0	S.	3	6	60-40	65-00	Rain. Loose and packed winter ice.
" 9.....	29.78	29.72	29.75	44	32	38.0	E.	5	5	60-54	65-21	Rain. P.M. clear. Loose field ice.
" 10.....	29.72	29.50	29.61	34	32	33.0	SE.	5	7	61-20	65-40	Rain. Loose ice floes.
" 11.....	29.50	29.24	29.37	36	33	34.5	S.	7	4	61-20	64-50	Fog. P.M., overcast. Loose ice.
" 12.....	29.74	29.50	29.62	38	27	32.5	SW.	6	4	Hatton Headl'nd		Clear. P.M., fog; packed winter ice. Few icebergs.
" 13.....	29.82	29.74	29.78	46	32	39.0	W.	3	2	61-45.2	65-40.9	Fog. P.M., clear. At south end Savage island.
" 14.....	30.00	29.82	29.91	42	28	35.0	E.	2	0	61-50.2	65-46	Clear and fine. At Savage isd. harbour.
" 15.....	29.98	29.96	29.97	43	35	39.0	SSW.	2	0	Savage Harbour		Clear and fine.
" 16.....	29.94	29.94	29.94	52	38	45.0	SSW.	2	0	Savage Harbour 61-20	64-53.6	Clear and fine.
" 17.....	29.94	29.88	29.91	44	28	36.0	SSE.	1	0			Clear and fine. At Hatton headland, Resolution island
" 18.....	29.88	29.88	29.88	58	30	44.0	WNW.	3	0	Acadia Cove		Scattered field ice.
" 19.....	29.88	29.80	29.84	34	29	31.5	E.	7	8	Acadia Cove.		Clear and fine.
" 20.....	29.96	29.80	29.88	39	29	34.0	SE.	4	4	Acadia Cove		Fog.
" 21.....	29.96	29.66	29.81	36	28	32.0	SSE.	6	8	Port Burwell		Rain-fog p.m. Overcast.
" 22.....	29.70	29.66	29.68	37	29	33.0	SE.	2	10	Port Burwell		Fog, p.m., rain. Scattered ice floes.
" 23.....	29.73	29.69	29.71	40	30	35.0	E.	6	4	Port Burwell		Rain.
" 24.....	29.80	29.76	29.78	37	30	33.5	NE.	4	2	Port Burwell 60-49	66-24	Fog., p.m., overcast. Overcast.
" 25.....	29.82	29.80	29.81	36	29	32.5	NNW.	3	7			Fog, p.m., rain. Scattered ice floes.



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Aug. 26.....	29.82	29.68	29.75	40	29	34.5	W.	3	4	62-24	71-57	Clear, p.m. fog. Scattered pans of ice.
" 27.....	29.68	29.56	29.62	40	28	34.0	WNW	6	8	62-35-3	73-59-8	Rain. At Charles Island harb.
" 28.....	29.80	29.64	29.72	37	28	32.5	W.	6	2	Charles Inlet		Clear and fine.
" 29.....	29.72	29.50	29.61	34	28	31.0	WSW.	5	4	Charles Inlet		Snowstorm, p.m., overcast.
" 30.....	29.88	29.72	29.80	35	29	32.0	ESE.	4	0	Cape Weggis		Clear and fine. Clear of ice.
" 31.....	30.02	29.88	29.95	46	31	38.5	NW.	4	0	Charles Inlet		Clear and fine.
Sept. 1.....	30.10	30.02	30.06	46	30	38.0	WSW.	2	0	Charles Inlet		Clear and fine.
" 2.....	30.10	29.95	30.02	58	32	45.0	NW.	1	0	62-26	79-36	Clear and fine. North of Mansel island.
" 3.....	29.95	29.75	29.85	44	30	37.0	ENE.	1	1	62-26	79-36	Overcast.
" 4.....	29.95	29.75	29.85	41	30	35.5	N.	10	1	62-10	83-12	Overcast. At Cary's Swan Nest, Coats island.
" 5.....	30.03	29.95	29.99	42	31	36.5	NNE.	8	1	62-10	83-12	Clear and fine; p.m., hazy.
" 6.....	30.05	30.03	30.04	49	31	40.0	NNW	3	0	62-10	83-12	Clear and fine.
" 7.....	30.04	30.00	30.02	48	33	40.5	NW.	4	0	62-26	79-36	Clear and fine. North of Mansel island.
" 8.....	30.16	30.00	30.08	38	34	36.0	WNW.	4	5	62-26	79-36	Overcast; p.m., fog.
" 9.....	30.28	30.16	30.22	49	34	41.5	W.	2	0	62-26	79-36	Clear and fine.
" 10.....	30.28	29.96	30.12	46	34	40.0	SSW.	4	3	61-54	80-20	Clear. P.M., fog.
" 11.....	29.95	29.70	29.83	39	34	36.5	S.	6	6	60-25	84-15	Fog. Clear in evening.
" 12.....	29.80	29.70	29.75	48	35	41.5	SE.	3	6	58-57	89-25	Clear. P.M., rain.
" 13.....	29.80	29.68	29.74	64	42	53.0	ENE.	4	4	Port Nelson		Clear. Rain in evening.
" 14.....	29.68	29.24	29.46	58	52	55.0	SSW.	5	3	Port Nelson		Showers. Clearing in evening
" 15.....	29.40	29.32	29.36	65	50	57.5	SW.	7	0	Port Nelson		aurora.
" 16.....	29.82	29.40	29.61	61	52	56.5	WSW.	3	4	Port Nelson		Clear and fine.
" 17.....	30.34	29.82	30.08	56	42	49.0	WNW.	2	1	57-12	92-06	Rain. Clear in evening aurora.
" 18.....	30.22	30.04	30.13	58	44	51.0	SE.	3	2	57-04	90-11	Clear and fine. P.M., overcast
" 19.....	30.06	29.48	20.77	44	34	39.0	ENE.	6	10	56-49	88-17	Clear and fine. Midnight, fog.
" 20.....	29.76	29.42	29.59	60	40	50.0	NNW.	4	1	56-14	87-39	Fog. P.M., rain and sleet.
" 21.....	29.72	29.80	29.76	49	38	43.5	NE.	3	10	56-14	87-39	Clear and fine. Off Port Severn.
" 22.....	29.96	29.80	29.88	46	34	40.0	NE.	4	10	56-22	87-27	Fog and rain.
" 23.....	30.00	29.96	29.98	48	34	41.0	SW.	2	1	55-30	85-21	Rain.
" 24.....	30.24	30.00	30.12	52	41	46.5	ESE.	2	3	55-23	85-11	Clear and fine. Off Winisk.
" 25.....	30.24	30.22	30.23	40	38	39.0	SW.	6	10	55-23	84-17	Clear. Rain in evening.
Sept. 26.....	30.50	30.22	30.36	39	34	36.5	E.	6	3	55-08	82-18	Rain.
" 27.....	30.66	30.50	30.58	44	36	40.0	ENE.	2	1			Showers; p.m., clear. Off Cape Henrietta Maria.
" 28.....	30.60	29.96	30.28	44	35	39.5	SSE.	9	1	55-10	82-14	Overcast; p.m., clear and fine.
" 29.....	30.18	29.80	29.99	46	39	42.5	NNW.	8	7	55-10	82-14	Clear and fine. Midnight, heavy rains.
" 30.....	30.20	30.00	30.10	42	38	40.0	W.	4	0	55-10	82-14	Rain-fog. Afternoon overcast.
Oct. 1.....	30.04	29.90	29.97	43	37	40.0	ESE.	4	8	55-10	82-14	Clear and fine.
" 2.....	30.10	29.68	20.89	46	34	40.0	NW.	6	1	55-10	82-14	Fog.
" 3.....	30.40	30.04	30.22	41	34	37.5	NE.	4	6	55-10	82-14	Overcast.
" 4.....	30.24	30.84	30.54	41	35	38.0	ESE.	6	5	56-27	86-15	Snow squalls.
" 5.....	30.44	30.24	30.34	44	34	39.0	N.	4	0			Rain and sleet. Clearing in evening.
" 6.....	30.32	29.98	30.15	44	36	40.0	N.	2	1	57-20	90-50	Clear and fine.
										Port Nelson		Clear and fine.



METEOROLOGICAL OBSERVATIONS taken on Board C.G.S. Acadia—Concluded.

Date.	BAROMETER.			THERMOMETER.			WIND.			LOCALITY.		Remarks.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Direction.	Force.	Clouds.	Lat.	Long.	
1914.												
Oct. 7.....	30.02	29.94	29.98	48	44	46.0	S.W.	2	4	Port Nelson		Fog. P.M., overcast.
" 8.....	29.94	29.70	29.82	48	36	42.0	SSW.	1	0	57-25	92-00	Clear and fine. Aurora.
" 9.....	30.20	29.76	29.98	36	32	34.0	NNW.	9	1	58-58	88-08	Clear and fine.
" 10.....	30.38	29.94	30.16	34	32	33.0	NNW.	7	3	60-34	84-23	Clear. P.M., snow squalls.
" 11.....	29.96	29.80	29.88	26	18	22.0	NNW.	9	10	61-31	79-43	Snow squalls. Anchored S.E. Mansel island.
" 12.....	29.94	29.80	29.87	22	20	21.0	N.	10	10	61-31	79-43	Snow flurries. Young ice.
" 13.....	30.00	29.64	29.82	28	20	24.0	NW.	5	2	61-31	79-43	Snow squalls. P.M., clear.
" 14.....	29.64	29.26	29.45	32	25	28.5	E.N.E.	6	8	62-27	79-21	Snow squalls. Encountered packed polar field ice.
" 15.....	29.56	29.36	29.46	27	18	22.5	N.N.E.	6	10	62-42	77-27	Snow squalls. Loose polar field ice.
" 16.....	29.70	29.56	29.63	20	18	19.0	W.N.W.	5	8	Charles inlet		Snow storm. Young ice.
" 17.....	29.66	29.48	29.57	20	16	18.0	N.E.	5	5	Charles inlet		Snow squalls. P.M., clear.
" 18.....	29.94	29.66	29.80	26	15	20.5	N.W.	6	10	62-33	73-35	Snow squalls.
" 19.....	30.02	29.86	29.94	26	23	24.5	N.W.	5	1	61-21	67-55	Clear and fine. Aurora.
" 20.....	29.86	29.68	29.77	25	22	23.5	N.E.	6	2	Off Savage island		Clear. Snow in evening. Few bergs.
" 21.....	29.88	28.72	29.80	28	25	26.5	N.	5	2	Off Savage Harb'r		Overcast. P.M., clear.
" 22.....	29.90	29.78	29.84	28	23	25.5	N.W.	6	1	Acadia cove		Clear. P.M., overcast. Resolution island.
" 23.....	29.88	29.32	29.60	32	24	28.0	SSW.	5	8	Minro Anchorage		Button islands. Overcast. P.M., snowstorm.
" 24.....	29.46	29.24	29.35	30	14	22.0	W.N.W.	7	10	Minto Anchorage		Snow-storm.
" 25.....	29.50	29.38	29.44	26	18	22.0	WSW.	8	5	Minto Anchorage		Blizzard. P.M., clear.
" 26.....	29.58	29.50	29.54	34	24	29.0	S.E.	7	6	Minto Anchorage		Overcast. P.M., snow squalls.
" 27.....	20.50	29.38	29.44	34	18	26.0	SW.	7	5	Minto Anchorage		Snow squalls. P.M., clear.
" 28.....	29.44	28.82	29.13	24	18	21.0	N.W.	5	3	Port Burwell		Clear and fine. P.M., snow.
" 29.....	29.64	28.82	29.23	25	23	24.0	W.N.W.	10	8	Port Burwell		Snow squalls.
" 30.....	29.68	29.62	29.65	31	25	28.0	WSW.	6	8	Port Burwell		Snow squalls.
" 31.....	29.76	29.46	29.61	28	27	27.5	SSW.	6	2	Port Burwell		Overcast.
Nov. 1.....	29.58	29.34	29.46	30	26	28.0	SSE.	5	6	Gray Straits		A.M., overcast; p.m., snow squalls.
" 2.....	29.76	29.58	29.67	25	19	22.0	NW.	6	5	Minto Anchorage		Snow squalls; overcast.
" 3.....	29.84	29.76	29.80	29	24	26.5	NW.	9	1	59 00	60-48	Clear. P.M., overcast.
" 4.....	29.84	29.44	29.64	34	30	32.0	NNW.	10	8	55-48	57-23	Snow squalls. Few icebergs.
" 5.....	29.62	29.44	29.53	32	30	31.0	NW.	10	6	52-24	54-57	Snow squalls.



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Nov. 6.....	29.84	29.62	29.73	36	32	34.0	NNE.	6	1	49-34	58-40	Clear. P.M., overcast. Ice- berg. Snow squalls. P.M., overcast. Overcast. Rain in evening. Rain. P.M., overcast. Arrived at 8 a.m. Overcast.
" 7.....	30.12	29.84	29.98	38	31	34.5	NNW.	5	4	North Sydney		
" 8.....	30.12	29.60	29.86	50	32	41.0	SSW.	6	4	46-20	60-01	
" 9.....	29.84	29.60	29.72	46	38	42.0	NW.	5	4	45-30	60-26	
" 10.....	29.82	29.72	29.77	42	32	37.0	NNE.	5	2	Halifax.		







APPENDIX IV.

DESCRIPTIONS OF BENCH-MARKS established by Automatic Water Gauges with Elevations determined by Water Surface Transfers, and precise Levelling.

Location.	Description.	Elev. in feet by	
		Water Surface Transfer.	Precise Levels, Instrumental.
	<i>Lake Superior.</i>		
Port Arthur, Ontario.	Port Arthur Bench-mark is the top of a steel rivet set vertically into foundation stone, first course above ground, situated at S.W. corner of C.P. Ry. freight office on Arthur street. W. S. transfer 1907-14 (inc.).....	616·154	.....
	<i>Georgian Bay.</i>		
Collingwood, Ontario.	Collingwood Bench-mark No. 668½ is the top of a steel rivet set vertically into the top of the plinth course N.E. corner of Collingwood Ship Building Co's pump-house. W. S. transfer 1906-11 and 14.....	587·858	587·40
French River.	French River Bench-mark No. 26 is the top of iron ring-bolt set in solid rock about 250 feet S.W. of Ontario Lumber Co's wharf. W. S. transfer 1906 and 1907.....	591·585	590·628
	<i>Lake Huron.</i>		
Goderich.	Goderich Bench-mark is the top of a steel rivet set vertically into cement foundation S.E. corner of chimney of Goderich water works, S. side harbour. W. S. transfer 1910-14 (inc.).....	588·579	.....
	<i>Lake Erie.</i>		
Port Colborne, Ontario.	Port Colborne Bench-mark is the top of a steel rivet set vertically into coping N. side of W. abutment of swing-bridge over S. entrance walls to guard lock of Welland canal. W. S. transfer 1911-14 (inc.).....	584·688	584·657
Port Stanley, Ontario.	Port Stanley Bench-mark is the top of a steel rivet set vertically into top course of stone abutment on N. side and at E. end of steel bridge over Kettle creek. W.S. transfer 1908-11 (inc.).....	586·998	.....
	<i>Lake Ontario.</i>		
Kingston, Ontario.	Kingston Bench-mark is the top of a steel rivet set vertically into top of plinth course, S.W. corner of pump-house at Kingston dry dock, transfer 1909-14 (inc.).....	252·721	252·892
Brighton, Ontario.	Brighton Bench-mark is the top of a steel rivet set vertically into a bastard marble rock about 1,000 feet N.W. of wharf and about 400 feet from shore; letters B.M. cut in rock. W. S. transfer 1908 and 109.....	256·572	
Toronto, Ontario.	Toronto Bench-mark No. 646½ is the top of a steel rivet set vertically into top of coping stone on S.E. corner of large arched portal of Garrison creek sewer, about 800 feet N. of W. end Queen's wharf. W. S. transfer 1906-09 (inc.).....	254·210	254·150
Port Dalhousie, Ontario.	Port Dalhousie Bench-mark is the top of a 2-inch nut on 1-inch iron bolt set vertically in concrete wharf, about 1 foot from inner face and close to automatic gauge house on S. side of approach to Welland canal. W. S. transfer 1910-14 (inc.)....	250·442	250·803



APPENDIX V.

BENCH-MARKS established by Automatic Water Gauges, and Elevations determined by Water Transfer.

Year.	LAKE ONTARIO.				LAKE ERIE.		LAKE HURON.		GEORGIAN BAY.				SUPERIOR.
	Brighton B.M. MCXCVIII.		Toronto B.M. 646 <sup>1</sup> / <sub>2</sub>	Port Dalhousie B.M.	Port Stanley B.M.	Port Colborne B.M.	Goderich B.M.	Mackinaw City.	Collingwood B.M. 668 <sup>1</sup> / <sub>2</sub>	French River B.M. Peter's 26.	Port Arthur B.M.	Marquette.	
	Trans. from Tibbett's Point.				Cleveland.	Buffalo.							
1906.....	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	
1907.....	.....	.....	254·361	.....	.....	.....	.....	.....	587·903	591·629	.....	.....	616·148
1908.....	.....	.....	254·202	.....	.....	.....	.....	.....	587·801	591·552	.....	.....	616·119
1909.....	.....	256·649	254·173	.....	.....	.....	.....	.....	587·852	.....	.....	.....	616·127
1909.....	.....	256·495	254·105	.....	.....	.....	.....	.....	587·873	.....	.....	.....	616·143
1910.....	252·683	.....	.....	.....	.....	.....	.....	.....	587·875	.....	.....	.....	616·112
1910.....	252·782	.....	.....	250·525	.....	.....	588·542	588·529	587·864	.....	.....	.....	616·199
1911.....	252·731	.....	.....	250·454	.....	584·592	588·562	588·565	.....	.....	.....	.....	616·203
1912.....	252·690	.....	.....	250·429	.....	584·734	588·599	588·609	.....	.....	.....	.....	616·183
1913.....	252·718	.....	.....	250·408	.....	584·704	588·595	588·585	.....	.....	.....	.....	.....
1914.....	252·720	.....	.....	250·394	.....	584·678	588·566	588·640	587·882	587·917	.....	.....	.....
Mean.....	252·721	256·572	254·210	250·442	586·998	584·688	588·579	.....	587·858	591·585	616·154	.....	.....

Elevations are in feet and referred to United States Standard datum or mean sea-level.



APPENDIX VI.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Montreal, Que. Year 1914.  
Elevations refer to mean sea-level which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1.....		22.05	21.72	20.13	19.70	18.96	18.48
2.....		21.98	21.69	20.09	19.74	18.90	18.70
3.....		21.82	21.60	20.22	19.79	18.80	18.92
4.....		21.84	21.41	20.17	19.80	18.78	18.89
5.....		21.84	21.36	20.09	19.76	18.91	18.91
6.....	24.00	21.64	21.38	20.00	19.78	19.12	19.12
7.....	24.04	21.53	21.45	19.98	19.94	18.85	18.94
8.....	24.11	21.82*	21.38*	20.06	20.11	18.72	18.74
9.....	24.28	21.87	21.47	19.97	20.02	18.83	18.74
10.....	26.26	21.75	21.38	19.97	19.88	18.81	18.71
11.....	24.44	21.72	21.22	19.97	19.74	18.61	18.58
12.....	24.49	21.72	21.16	20.01	19.57	18.82	18.51
13.....	24.18	21.67	21.13	19.84	19.41	18.90	18.63*
14.....	23.99	21.48	21.01	19.73	19.35	18.70	18.47*
15.....	23.95	21.33	20.87	19.72	19.33	18.50	18.55
16.....	23.77	21.44	20.78	19.69	19.28	18.65	18.72
17.....	23.62	21.21	20.69	19.69	19.24	18.72	18.27*
18.....	23.38	21.08	20.71	19.64*	19.27	18.80	19.35
19.....	23.22	21.03	20.68	19.76*	19.27	19.38	19.33
20.....	23.09	21.10	20.53	19.75	19.17	19.31	19.86
21.....	22.97	20.93	20.53	19.72	19.21	19.21	19.41
22.....	22.81	21.06	20.54	19.79	19.30	19.33	19.02
23.....	22.74	21.15	20.55	19.81	19.34	19.16	18.97*
24.....	22.55	21.25	20.55	19.94	19.41	18.98	.....
25.....	22.39	21.41	20.49	19.91	19.41	18.73	18.71*
26.....	22.22	21.48	20.60	19.84	19.29	18.72	18.69
27.....	22.23	21.47	20.66	19.75	19.15	18.82	18.90
28.....	22.37	21.49	20.66	19.64	19.23	18.59	18.84
29.....	22.31	21.51	20.64	19.62	19.08	18.64	18.69*
30.....	22.12	21.84	20.47	19.74	19.02	18.78	.....
31.....	22.04	.....	20.27	19.69	.....	18.76	.....
Mean.....	23.29	21.52	20.95	19.87	19.49	18.86	18.88

\* Denotes that mean is of less than 24 hourly readings.



APPENDIX VII.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Longue Pointe, Que, 1914.  
Elevations refer to mean sea-level which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
	Feet	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....		20.71	20.47	18.88	18.45	17.82	17.52
2.....		20.64	20.43	18.82	18.48	17.77	17.63
3.....		20.49	20.31	18.93*	18.54	17.66	17.82
4.....		20.53	20.13	18.88	18.55	17.66	17.84
5.....		20.56	20.07	18.82	18.53	17.76	17.84
6.....	22.80*	20.38	20.08	18.74	18.56	17.97	18.06
7.....	22.85	20.24	20.14	18.71	18.71	17.73	17.91
8.....	22.95	20.54	20.07	18.79	18.89	17.58	17.69
9.....	23.11	20.61	20.19	18.73	18.82	17.70	17.66
10.....	23.12	20.45	20.11	18.72	18.69	17.70	17.66
11.....	23.28	20.41	19.95	18.71	18.56	17.57	17.51*
12.....	23.35	20.41	19.89	18.73	18.39	17.66	17.41*
13.....	23.05	20.36	19.84	18.57	18.24	17.76	17.52
14.....	22.84	20.16	19.72	18.47	18.14	17.59	17.37
15.....	22.75	19.98	19.56	18.45	18.10	17.38	17.52
16.....	22.53	20.09	19.46	18.42	18.05	17.49	17.65*
17.....	22.39	19.88	19.35	18.40	18.02	17.64	17.98
18.....	22.12	19.71	19.37	18.37	18.08	17.76	18.25
19.....	21.94	19.65	19.34	18.46	18.12	18.37	18.28
20.....	21.78	19.73	19.20	18.48	18.03	18.33	18.82
21.....	21.66	19.60	19.19	18.45	18.07	18.16	18.43
22.....	21.49	19.70	19.22	18.54	18.17	18.27	18.02
23.....	21.45	19.80	19.25	18.58	18.20	18.13	17.89*
24.....	21.26	19.92	19.27	18.69	18.27	17.92	
25.....	21.09	20.07	19.23	18.68	18.27	17.69	17.54*
26.....	20.90	20.17	19.34	18.60	18.15	17.61	17.56
27.....	20.92	20.16	19.38	18.51	18.06	17.68	17.76
28.....	21.04	20.22	19.38	18.42	18.08	17.43	17.76
29.....	21.00	20.29	19.38	18.43	17.92	17.48	
30.....	20.81	20.62	19.24	18.53*	17.86	17.64	
31.....	20.72		19.03	18.46		17.65	
Mean.....	22.05	20.20	19.66	18.61	18.30	17.76	17.81

\*Denotes that mean is of less than 24 hourly readings.



APPENDIX VIII.

DAILY MEAN ELEVATION of Lower St. Lawrence at Varennes, Que., Year 1914.  
Elevations refer to mean sea-level which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....		19.37	19.19	17.47	16.97	16.59*	
2.....		19.31	19.13	17.39	16.98		
3.....		19.14	19.00	17.47	17.05		
4.....		19.19	18.81	17.45	17.08		
5.....		19.25	18.73	17.41	17.06		
6.....		19.09	18.74	17.33	17.11	16.65*	16.70
7.....	21.69*	18.64	18.78	17.30	17.25		
8.....	21.81	19.26	18.72	17.37	17.45		
9.....	22.02	19.32*	18.86	17.32	17.40		
10.....	22.06*	19.16	18.81	17.30	17.27		
11.....	22.20	19.11	18.63	17.27	17.13		
12.....	22.25	19.08	18.56	17.28	16.95		
13.....	21.95	19.03	18.49	17.13	16.80		
14.....	21.70	18.82	18.36	17.01	16.67		
15.....	21.59	18.60	18.18	16.95	16.59		
16.....	21.33*	18.69	18.06	16.90	16.58		
17.....	21.18	18.48	17.92	16.87	16.58		16.71*
18.....	20.86	18.28	17.95	16.84	16.60	16.64*	16.85*
19.....	20.65	18.21	17.92	16.95	16.71	17.08	16.98*
20.....	20.49*	18.27	17.75	16.99	16.64	17.04	17.56
21.....	20.38	18.17	17.73	16.99	16.62	16.83	17.20
22.....	20.20*	18.28	17.76	17.08	16.75	16.94	16.78
23.....	20.17	18.42	17.82	17.14	16.80	16.79	
24.....	20.00	18.56	17.85	17.24	16.86	16.59	
25.....	19.81	18.72	17.82	17.24	16.86		
26.....	19.59	18.82	17.94	17.16	16.79		
27.....	19.55*	18.84	17.99	17.08	16.71		
28.....	19.70	18.95	17.99	16.98	16.72		
29.....	19.69	19.03	18.02	17.02	16.60		
30.....	19.46*	19.35	17.89	17.12	16.59		
31.....	19.35*		17.64	17.00			
Mean.....	20.79	18.86	18.29	17.16	16.87	16.79	

\* Denotes that mean is of less than 24 hourly readings.



APPENDIX IX.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Verchères, Que., Year 1914.  
Elevations refer to mean sea-level which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....		17.75	17.64	15.92	15.43	14.78	14.58
2.....		17.68	17.55	15.82	15.46	14.75	14.64
3.....		17.54	17.42	15.89	15.54	14.67	14.91
4.....		17.58	17.22	15.88	15.57	14.69	15.00
5.....		17.64	17.13	15.85	15.55	14.82	14.98
6.....		17.52	17.13	15.81	15.62	15.04	15.23
7.....		17.37	17.17	15.79	15.77	14.84	15.11
8.....	20.52*	17.70	17.13	15.85	15.95	14.66	14.84
9.....	20.63	17.90	17.27	15.78	15.91	14.77	14.75
10.....	20.69*	17.68	17.24	15.77	15.78	14.79	14.72
11.....	20.80*	17.61	17.07	15.73	15.64	14.69	14.60
12.....	20.84*	17.59	16.98	15.73	15.46	14.63	14.43
13.....	20.58*	17.52	16.90	15.59	15.29	14.72	14.63
14.....	20.22*	17.28	16.74	15.47	15.12	14.58	14.40
15.....	20.11	17.06	16.57	15.39	15.03	14.39	14.64
16.....	19.85	17.11	16.44	15.33	14.96	14.45	14.80
17.....	19.66	16.90	16.29	15.27	14.96	14.71	15.12*
18.....	19.32	16.70	16.33	15.25	15.06	14.92	.....
19.....	19.08	16.62	16.27	15.36	15.18	15.70	15.38*
20.....	18.89	16.65	16.10	15.41	15.12	15.69	16.03
21.....	18.77	16.57	16.07	15.44	15.18	15.44	15.74
22.....	18.63	16.67	16.13	15.56	15.28	15.53	15.27*
23.....	18.61	16.83	16.21	15.66	15.32	15.37	.....
24.....	18.43	16.98	16.26	15.74	15.40	15.09	.....
25.....	18.24	17.14	16.27	15.75	15.40	14.83	.....
26.....	18.01*	17.25	16.40	15.68	15.26	14.66	14.44*
27.....	18.02	17.27	16.44	15.59	15.13	14.68	14.68
28.....	18.13	17.41	16.45	15.50	15.09	14.42	14.80*
29.....	18.13	17.51	16.48	15.53	14.91	14.42	.....
30.....	17.94*	17.84	16.36	15.62	14.82	14.63	.....
31.....	17.82*	.....	16.10	15.48	.....	14.69	.....
Mean.....	19.25	17.30	16.70	15.63	15.34	14.84	14.90

\* Sign denotes that mean is of less than 24 hourly readings.



APPENDIX X.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Lanoraie, Que., Year 1914.  
Elevations refer to mean sea-level which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....	18.47	16.04	15.88	14.13	13.62	13.01	12.94
2.....	18.34	15.94	15.78	13.99	13.69	13.03	12.96
3.....	18.25	15.82	15.60	14.04	13.82	12.99	13.29
4.....	18.19	15.86	15.42	14.06	13.83	13.04	13.39
5.....	18.36	15.93	15.32	14.07	13.82	13.18	13.48
6.....	18.51	15.88	15.31	14.06	13.91	13.32	13.57
7.....	18.60	15.72	15.34	14.07	14.09	13.21	13.45
8.....	18.78	16.07	15.36	14.10	14.26	13.01	13.32
9.....	19.07	16.31	15.50	14.06	14.21	13.12	13.06
10.....	19.20	16.07	15.50	14.04	14.07	13.15	12.98
11.....	19.32	15.95	15.34	13.99	13.92	13.10	12.90
12.....	19.28	15.94	15.22	13.95	13.73	12.92	12.66*
13.....	19.02	15.81	15.11	13.83	13.53	12.92	12.87
14.....	18.72	15.51	14.94	13.69	13.30	12.80	12.77
15.....	18.49	15.30	14.73	13.60	13.16	12.63	12.97
16.....	18.18	15.25	14.59	13.46	13.11	12.67	13.18
17.....	17.94	15.08	14.42	13.37	13.13	13.03	13.48
18.....	17.58	14.87	14.40	13.40	13.27	13.33	.....
19.....	17.30	14.77	14.30	13.52	13.46	14.20	.....
20.....	17.11	14.72	14.18	13.60	13.49	14.27	.....
21.....	17.01	14.72	14.14	13.70	13.59	13.99	.....
22.....	16.91	14.81	14.23	13.87	13.69	14.00	.....
23.....	16.91	15.01	14.37	13.99	13.73	13.88	.....
24.....	16.74	15.21	14.45	14.06	13.79	13.50	.....
25.....	16.56	15.37	14.53	14.06	13.78	13.21	.....
26.....	16.37	15.47	14.66	13.99	13.62	13.01	.....
27.....	16.35	15.47	14.69	13.91	13.44	12.93	.....
28.....	16.45	15.64	14.71	13.78	13.29	12.66	.....
29.....	16.45	15.81	14.76	13.83	13.14	12.64	.....
30.....	16.29	16.09	14.63	13.87	13.01	12.88	.....
31.....	16.13	.....	14.35	13.73	.....	13.00	.....
Mean.....	17.77	15.55	14.90	13.87	13.62	13.18	13.13

\* Denotes that mean is of less than 24 hourly readings.



APPENDIX XI.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Sorel, Que., Year 1914.  
Elevations refer to mean sea-level which is 6.13 above Steckel's datum.

Days.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
	Fect.	Feet.	Feet.	Feet.	Fect.	Feet.	Fect.	Feet.
1.....		17.93	15.53	15.44	13.73	13.24	12.65	12.56
2.....		17.78	15.41	15.34	13.59	13.31	12.67	12.60
3.....		17.70	15.32	15.16	13.64	13.44	12.63	12.93*
4.....		17.64	15.36	14.98	13.67	13.45	12.68	13.12*
5.....		17.82	15.43	14.88	13.68	13.44	12.83	
6.....		17.96	15.41	14.87	13.67	13.47*	12.97	
7.....		18.08	15.27	14.90	13.68	13.74*	12.86	13.09*
8.....		18.27	15.59	14.92	13.71	13.88	12.66	12.87
9.....		18.57	15.82	15.06	13.67	13.83	12.72*	12.71
10.....		18.73	15.58	15.05	13.65	13.69	12.79*	12.63
11.....		18.83	15.47	14.91	13.60	13.54	12.75	12.54
12.....		18.80	15.46	14.79	13.56	13.35	12.56	12.32*
13.....		18.55	15.34	14.67	13.44	13.15	12.56	12.43
14—.....		18.23	15.04	14.51	13.30	12.92	12.44	12.42*
15.....		17.97	14.84	14.30	13.21	12.78	12.27	12.62
16.....		17.68	14.79	14.16	13.08	12.73	12.31	12.83*
17.....		17.43	14.63	14.00	12.99	12.76	12.66*	13.13
18.....		17.06	14.42	13.98	13.02	12.90	13.03*	
19.....		16.76	14.32	13.88	13.14	13.09	13.83	
20.....		16.57	14.28	13.76	13.22	13.12	13.90	
21.....		16.47	14.29	13.72	13.32	13.22	13.62	
22.....		16.37	14.38	13.82	13.49	13.32	13.63	
23.....		16.36	14.58	13.96	13.61	13.36	13.51	
24.....		16.21	14.78	14.04	13.68	13.42	13.13	
25.....		16.02	14.94	14.12	13.68	13.41	12.84	
26.....		15.85	15.03	14.25	13.61	13.25	12.64	
27.....	17.96*	15.83	15.04	14.28	13.53	13.08	12.56	
28.....	17.87	15.94	15.21	14.30	13.40	12.93	12.30	
29.....	18.01	15.94	15.38	14.36	13.45	12.78	12.28	
30.....	18.02	15.77	15.65	14.23	13.49	12.65	12.50*	
31.....		15.62		13.95	13.35		12.64*	
Mean.....	17.96	17.25	15.09	14.47	13.48	13.24	12.82	12.72

\* Sign denotes that mean is of less than 24 hourly readings.



APPENDIX XII.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Light No. 2 Lake St. Peter, Que., Year 1914. Elevations refer to mean sea-level which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1		14.63	14.50	12.54	11.96	11.33	11.65
2		14.49	14.32	12.37	12.09	11.38	11.67
3		14.44	14.15	12.36	12.32	11.38	12.04
4		14.46	14.00	12.44	12.32	11.46	12.22
5		14.49	13.89	12.48	12.29	11.63	12.39
6		14.57	13.87	12.51	12.37	11.68	12.49
7		14.44	13.89	12.54	12.61	11.71	12.35
8		14.69	13.94	12.55	12.78	11.47	12.05
9		14.98	14.03	12.52	12.68	11.57	11.75
10		14.82	14.05	12.47	12.54	11.65	11.68
11		14.65	13.95	12.40	12.33	11.68	11.57
12		14.62	13.79	12.29	12.11	11.38	11.37
13	17.83*	14.47	13.62	12.15	11.85	11.28	11.45
14	17.49	14.15	13.43	12.02	11.56	11.17	11.55
15	17.16	13.91	13.19	11.89	11.37	10.99	11.64
16	16.83	13.77	13.03	11.70	11.33	11.07	12.07*
17	16.53	13.68	12.86	11.55	11.40	11.57	12.40*
18	16.21	13.46	12.75	11.64	11.59	12.00	12.58
19	15.88	13.34	12.64	11.78	11.86	12.80	
20	15.66	13.31	12.56	11.90	12.02	13.08	
21	15.55	13.37	12.50	12.08	12.14	12.88	
22	15.47	13.42	12.64	12.34	12.26	12.77	
23	15.48	13.67	12.83	12.49	12.31	12.69	
24	15.38	13.88	12.93	12.57	12.34	12.21	
25	15.19	14.04	13.02	12.55	12.32	11.90	
26	15.06	14.11	13.16	12.47	12.09	11.62	
27	15.01	14.09	13.20	12.37	11.85	11.47*	
28	15.05	14.17	13.18	12.23	11.58	11.26	
29	15.06	14.35	13.20	12.18	11.47	11.20	
30	14.94	14.60	13.10	12.21	11.28	11.51	
31	14.78		12.80	12.10		11.72	
Mean.....	15.82	14.17	13.39	12.25	12.03	11.73	11.94

\* Denotes that mean is less than 24 hourly readings.



## LIFE SAVING SERVICE.

OTTAWA, May 1, 1915.

The Deputy Minister,  
Department of Naval Service,  
Ottawa.

SIR,—I have the honour to report as follows regarding the Life Saving Service for the year ending 31st March, 1915.

With the advent of the gasoline boat and the gradual disappearance of sailing vessels, the work of most of these stations has considerably decreased, as the motor boats are not so easily capsized and among the fishing communities they are so numerous that the occupants are able to render assistance to one another in case of engines breaking down, etc.

## NOVA SCOTIA.

*Bay View.*—The permanent crew employed at this station have rendered assistance in various ways to many fishing boats during the year, as well as to two schooners.

*Canso.*—Volunteer crew. The schooner *J. L. Coreall* ran ashore on the 20th November and was completely wrecked; crew of six were rescued by life-boat.

On January 8, 1915, the steamer *Kilkeel*, loaded with coal, was wrecked on a rock just off Canso, and the life-boat was successful in saving the crew.

*Cheticamp.*—Permanent crew. The disabled motor and fishing boats towed into harbour or otherwise assisted by the crew during the year were very numerous. Members of the crew also acted as pilots on various occasions as required.

*Clark's Harbour.*—Volunteer crew. The *Clarence H. Venner* was wrecked off Cape Sable on 18th July, 1914, but on arrival of the life-boat it was found that she had already been abandoned by the crew.

*Duncan's Cove.*—Volunteer crew. On 8th June two fishermen were rescued from a fishing smack *Merry Widow*, which ran ashore on Duncan's Reef.

*Scatarie.*—Volunteer crew. This crew has been of assistance to three vessels within the year just ended. On the 27th May the schooner *Alice M.* was becalmed and obliged to anchor on the margin of the breakers, and as there was a heavy swell at the time, it was necessary for the life-boat to go out and bring them to a safe anchorage.

On the 18th July the schooner *Harold C. Beecher* was completely wrecked off Tin Cove, and on the 20th July the Cuban s. s. *Cienfuegos* off South Point. The life-boat rendered all assistance possible on both these occasions and no lives were lost.

*Seal Island.*—Subsidized volunteer crew. The schooner *Alice Gertrude* was wrecked on the rocks at Crowell Cove on 25th May. The lifeboat crew went out to her but were unable to do anything with her, though they worked for some time.



## SESSIONAL PAPER No. 38

On 8th August the *Nellie C. Davis*, a schooner from Portland, Maine, ran ashore on the south end of Seal island in a dense fog. The crew went ashore in their own boats before the life-boat reached her. The life-saving crew, however, succeeded in saving considerable gear, stores, etc.

*Westport, Brier Island.*—Volunteer crew. Only one wreck was reported from this vicinity during the fiscal year. This was the schooner *Grace Darling*, which became a total wreck on Dartmouth Ledge. Crew saved.

## PRINCE EDWARD ISLAND.

*Cascumpeque.*—Volunteer crew. On 15th November, 1914, this crew were able to be of assistance to the schooner *Loring B. Haskell* for a second time. The vessel grounded on the bar in entering the harbour and sprang a leak. The life-boat crew went out, boarded the vessel and gave every assistance in pumping, etc., and when the tide rose helped to bring her safely into the harbour.

## NEW BRUNSWICK.

*Little Wood Island.*—Permanent crew. During the year they have rendered assistance to various disabled fishing and motor boats. On 29th January the life-boat went to Gannet rock and conveyed the light keeper's wife, who was very ill, to Seal island. On 10th April they went to the assistance of a schooner which ran ashore on Ledge Tern, took the crew and captain's wife off and looked after them for two days. They also succeeded in floating the vessel.

*Richibucto.*—Permanent crew. Various fishing boats with broken down engines or otherwise disabled were towed into harbour by this crew. They also assisted in refloating two schooners which went ashore off Richibucto.

## QUEBEC.

*Entry Island.*—No crew; the coxswain calls for volunteers in the case of a wreck occurring. On the 11th April, 1915, a volunteer crew went out to look for two men who had gone out among the drift ice, and, after considerable search, found them in an exhausted condition.

On the 20th May, a volunteer crew went to the assistance of the schooner *Marion Emma*, which had run ashore on the southwest of Entry island. After bringing the crew ashore, they returned to the vessel and succeeded in floating her and bringing her into Amherst harbour.

## ONTARIO.

*Goderich.*—Volunteer crew. This crew, on the 11th March, 1915, with great difficulty, rescued five fishermen whose boat was caught in an ice jam in lake Huron.

*Long Point.*—Permanent crew. On the 27th June, 1914, a gasoline launch, *Coquinta*, ran ashore in a heavy northeast storm, and on the 1st July a sailing yacht, *Eldro*, also ran ashore. The life-boat crew gave assistance in floating both these vessels.

*Point Pelee.*—Permanent crew. The steamer *Bulgaria*, loaded with coal, was sunk off Point Pelee on the 13th October last and eighteen lives were saved by the life-saving crew.



6 GEORGE V, A. 1916

*Port Hope.*—Volunteer crew. On the 11th March, 1915, the life-boat went out to Gull light and brought back two boys who had drifted there in a canoe.

*Toronto.*—Permanent crew. This station is a very well equipped one and the calls upon it are numerous as there are such large numbers of pleasure boats, etc., in the vicinity. During the past season of navigation one hundred and fifty-four calls were answered, first aid treatment and other assistance being given where necessary.

## BRITISH COLUMBIA.

*Banfield.*—Permanent crew. On the 24th June 1914, crew went to the assistance of the fishing schooner *Jessie*, which had been disabled off Cape Beale. She was towed into anchorage and arrangement made for a tug to go to her assistance.

The sloop *Emu* went ashore at the entrance to the Pachena River on the 2nd November, and after three days' work the Life Saving crew succeeded in floating her.

*Clayoquot.*—Permanent crew during winter. On the 13th August crew went to the assistance of the gasoline launch *Annie*, which was caught in a storm, and succeeded in bringing her in safely after a long search.

The crew has also been of assistance to various disabled fishing boats.

*Uchuelot.*—Permanent crew. The life boat at this station has been of considerable service to fishing boats, etc. In June 1914 she assisted the Banfield crew in their efforts to save the schooner *Jessie* and in September assisted the Clayoquet crew in their search for a motor boat.

On 6th November 1914, she went out to Fisheries Launch No. 1, which was drifting off the mouth of the harbour, her machinery having gone wrong, and managed to pick her up as she was drifting onto a dangerous rock.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,

*Vice Admiral, Director of the Naval Service.*



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## STATEMENT OF EXPENDITURE.

## Rewards, Saving Life, 1914, 1915.

	\$	cts.	\$	cts.
General Account.....			2,078	65
Rewards.....			863	30
Nova Scotia—				
Baker's Cove.....	327	75		
Bay View.....	7,166	88		
Blanche.....	371	06		
Canso.....	503	75		
Cheticamp.....	4,266	65		
Clark's Harbour.....	407	08		
Devil's Island.....	735	78		
Duncan's Cove.....	1,007	56		
Herring Cove.....	716	04		
Pictou.....	271	00		
Port Mouton.....	398	01		
Sable Island.....	289	20		
St. Paul's Island.....	6	26		
Scatari.....	493	67		
Seal Island.....	1,251	69		
West Port.....	605	00		
Whitehead.....	289	75		
			19,107	13
Prince Edward Island—				
Alberton.....	440	17		
Cascumpec.....	419	96		
Charlottetown.....	466	00		
Priest Pond.....	378	58		
Souris.....	611	25		
			2,315	96
New Brunswick—				
Cape Tormentine.....	285	00		
Escuminac.....	300	23		
Little Wood Island.....	7,714	72		
Richibucto.....	3,887	81		
			12,187	76
Quebec—				
Entry Island.....	25	00		
			25	00
Ontario—				
Cobourg.....	428	25		
Collingwood.....	416	62		
Consecon.....	382	25		
Goderich.....	559	51		
Kincardine.....	287	00		
Long Point.....	6,839	86		
Point Pelee.....	4,878	51		
Port Hope.....	390	26		
Port Stanley.....	444	27		
Southampton.....	476	87		
Toronto.....	19,273	58		
			34,376	96
British Columbia—				
Banfield Creek.....	11,612	06		
Clayoquot.....	6,515	26		
Cloose.....	60	00		
Ucluelet.....	12,650	43		
West Coast Trail.....	1,830	25		
			32,668	00
			103,622	78



6 GEORGE V, A. 1916

No.	Stations.	Estab- lished.	Coxswain.	Crew.	Description of Boat.
<i>New Brunswick.</i>					
1	Little Wood Island.....	1910	Harry Harvey.....	8	Beebe-McLellan twin screw, motor boat.
2	Richibucto.....	1907	L. A. Hains.....	7	Race Point surf-boat, 24 feet long.
3	Point Escuminac.....	1908	E. F. Flieger.....	7	Beebe-McLellan self-bailing.
4	Cape Tormentine.....	1912	I. Allen.....	7	" " "
<i>Nova Scotia.</i>					
5	Baker's Cove.....	1886	R. L. Baker.....	7	Dobbin's pattern self-righting, 28 feet long.
6	Blanche.....	1889	Edgar Swaine.....	7	Beebe-McLellan surf-boat, self-bailing, 25 ft. long.
7	Clark Harbour.....	1900	W. D. Attwood.....	7	Beebe-McLellan self-bailing, 25 ft. long, low ends.
8	Canso.....		J. J. Berrigan.....	7	Dobbin's pattern surf-boat, self-bailing, 25 ft. long.
9	Devil's Island.....	1885	B. H. Hennebery.....	7	Beebe-McLellan surf-boat, self-bailing, 25 ft. long.
10	Duncan Cove.....	1886	J. W. Holland.....	7	" " "
11	Herring Cove.....	1885	Edw. V. Dempsey.....	7	Dobbin's pattern self-righting and bailing, 25 ft. long.
12	Pictou Island.....	1889	Duncan McCallum.....	7	" " "
13	Port Mouton.....	1889	Walter Cooke.....	7	Beebe-McLellan surf-boat, self-bailing, 25 ft. long.
14	Scattarie.....	1885	Jas. Nearing.....	7	Beebe-McLellan boat on East side.
15	Seal Island.....	1880	Smyth G. Penney.....	7	Beebe-McLellan boat on West side.
16	St. Paul Island.....	1885	Supt. Humane Estab- lishment.	3	Beebe-McLellan self-bailing, 25 ft. long, low ends.
17	Whitehead.....	1890	John Phalen.....	7	Dobbin's pattern surf-boat, self-bailing, 25 ft. long.
18	Sable Island.....	1885	Douglas Henneberry and Jas. Ritcey.	.....	Two Dobbin's pattern, self-righting and bailing, and one Beebe-McLellan, self-bailing.
19	Cheticamp.....	1911	L. J. Aucoin.....	7	Beebe-McLellan twin screw, motor boat.
20	Bay View (Digby County.)	1911	J. W. Hayden. ....	7	36 ft. self-bailing, self-righting power boat.
<i>P. E. Island.</i>					
21	Priest Pond.....	1909	Chas. Campbell.....	12	Board of Trade rocket apparatus.
22	Charlottetown.....	1907	E. White.....	6	Beebe-McLellan self-bailing.
23	Souris.....	1907	Pius Cheverie.....	7	" " "
24	Alberton.....	1907	Gordon Bennett.....	12	" " "
25	Cascumpeque .....		Joshua Hutt.....	8	Board of Trade rocket apparatus.
<i>British Columbia.</i>					
26	Banfield.....	{1909 1907}	Geo. Murray.....	11	Self-righting, self-bailing, 36 ft. power boat.
27	Ucluelet.....	1908	W. L. Thompson.....	9	Doherty's Improved Beebe-McLellan, 25 ft. long.
28	Clayoquot.....	1908	J. McLeod.....	8	" " "
<i>Ontario. Great Lakes.</i>					
29	Cobourg.....	1882	D. Rooney.....	8	Dobbin's pattern, self-righting and bailing.



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No.	Stations.	Estab- lished.	Coxswain.	Crew.	Description of Boat.
	<i>Ontario. Great Lakes.</i>				
30	Collingwood.....	1885	G. F. Watts.....	7	Beebe-McLellan self-bailing surf-boat.
31	Goderich.....	1886	Malc. McDonald.....	7	Surf-boat.
32	Kincardine.....	1903	Thos. McGaw.....	7	Beebe-McLellan self-bailing surf-boat.
33	Long Point.....	1902	Jas. Smith.....	9	Surf-boat.
34	Point Pelee.....	1900	L. Wilkinson.....	7	"
35	Port Hope.....,	1889	John McMahon.....	7	Dobbin's pattern, self-righting and bailing.
36	Port Stanley.....	1885	J. R. Rose.....	7	Beebe-McLellan surf-boat, self- bailing, 25 ft. long.
37	Toronto Island.....	1883	W. F. Chapman.....	14	Dobbin's pattern, self-righting and bailing.
38	Consecon.....	1898	R. Bedford.....	7	" " "
39	Southampton.....	1907	Hector McLeod.....	7	Beebe-McLellan surf-boat, self- bailing.



ANNUAL REPORT OF RADIOTELEGRAPH BRANCH,  
1914-15.

The Deputy Minister,  
Department of the Naval Service,  
Ottawa.

SIR,—I have the honour to present herewith the Annual Report of the Radiotelegraph Branch for the fiscal year ending March 31, 1915.  
There has been an increase of 78 in the number of radiotelegraph stations established in Canada and on Canadian ships during the year, as follows:—

Government Ship Stations.....	3
Licensed Ship Stations.....	18
Licensed Commercial Stations.....	8
Licensed Amateur Stations.:.....	48
Licensed Experimental Station.....	1

The total number of stations now in operation is as follows:—

	1913-14.	1914-15.	Increase.
Government Commercial Stations.....	1	1	.....
Coast Stations.....	42	42	.....
Government Ship Stations.....	21	24	3
Licensed Ship Stations.....	50	68	18
Licensed Commercial Stations.....	8	16	8
Licensed Amateur Stations.....	47	95	48
Licensed Experimental Station.....	.....	1	1
	169	247	78



## SESSIONAL PAPER No. 38

The following list shows the location of the land and coast stations in Canada their range, call signals, owners and by whom they are operated:—

## COAST STATIONS for Communication with Ships.

## EAST COAST.

Name.	Where Situated.	Owned by.	Operated by.	Range in nautical miles.	Call Signal.
Belle Isle, Nfld.....	Belle Isle Straits.....	Dominion Government.	Marconi Wire- less Tel. Co. of Canada.	250	VCM
Pt. Amour, Nfld.....	" "	"	"	150	VCL
Pt. Riche, Nfld.....	Gulf of St. Lawrence....	"	"	250	VCH
Harrington, P.Q.....	"	"	"	150	VCJ
Heath Pt., P.Q.....	Gulf of St. Lawrence (Anticosti Isld.).....	"	"	250	VCI
Cape Ray, Nfld.....	Cabot Straits.....	"	"	350	VCR
Cape Race, Nfld.....	North Atlantic.....	"	"	400	VCE
Grindstone Island, P.Q.....	Gulf of St. Lawrence (Magdalen Isld.).....	"	"	200	VCN
Fame Pt., P.Q.....	Gulf of St. Lawrence....	"	"	250	VCG
Clarke City, P.Q.....	"	"	"	250	VCK
Father Pt., P.Q.....	River St. Lawrence....	"	"	250	VCF
Grosse Isle, P.Q.....	"	"	"	100	VCD
Quebec, P.Q.....	"	"	"	150	VCC
Three Rivers, P.Q.....	"	"	"	150	VCB
Montreal, P.Q.....	"	"	"	200	VCA
Cape Sable, N.S.....	North Atlantic.....	"	"	250	VCU
Partridge Isld., St. John, N.B.	Entrance St. John Harbour, N.B.	"	"	250	VCV
Cape Bear, P.E.I.....	Northumberland Strait.	"	"	150	VCP
Camperdown, N.S.....	Entrance to Halifax Har- bour..	"	"	250	VCS
Sable Island, N.S.....	North Atlantic.....	"	"	300	VCT
Halifax, N.S.....	Halifax Dockyard.....	"	Department of the Naval Service.	100	VAA
Pictou, N.S.....	Northumberland Strait.	Marconi Wire- less Tel. Co. of Canada.	Marconi Wire- less Tel. Co. of Canada.	100	VCQ
North Sydney, C.B.....	North Sydney, C.B.....	"	"	100	VCO

## GREAT LAKES.

Port Arthur, Ont.....	Port Arthur, Ont.....	Dominion Government.	Marconi Wire- less Tel. Co. of Canada.	350	VBA
Sault Ste. Marie, Ont.....	Sault Ste. Marie, Ont...	"	"	350	VBB
Tobermory, Ont.....	Entrance Georgian Bay.	"	"	350	VBD
Midland, Ont.....	Georgian Bay.....	"	"	350	VBC
Point Edward, Ont.....	Lake Huron.....	"	"	350	VBE
Port Burwell, Ont.....	Lake Erie.....	"	"	350	VBF
Toronto, Ont.....	Toronto Island, Ont.....	"	"	350	VBG
Kingston, Ont.....	Barriefield Common....	"	"	350	VBH



COAST STATIONS for Communication with Ships—*Concluded.*

WEST COAST.

Name.	Where Situated.	Owned by.	Operated by.	Range in nautical miles.	Call Signal.
Gonzales Hill, B.C. (Victoria).	Victoria, B.C.....	Dominion Government.	Department of the Naval Service.	250	VAK
Pt. Grey, B.C. (Vancouver)...	Entrance Vancouver Harbour.	"	"	150	VAB
Cape Lazo, B.C.....	Strait Georgia, near Comox, B.C.	"	"	350	VAC
Pachena Pt., B.C.....	West Coast Vancouver Isld.	"	"	500	VAD
Estevan Pt., B.C.....	"	"	"	500	VAE
Triangle Isld., B.C.....	South of Hecate Str.....	"	"	450	VAG
Ikeda Head, B.C.....	South of Moresby Island, Q.C.I.	"	"	250	VAI
Dead Tree Pt., B.C.....	South of Graham Isld., Q.C.I.	"	"	200	VAH
Digby Island, B.C., Prince Rupert.	Digby Isld., Entrance Prince Rupert Har.	"	"	250	VAJ
Alert Bay, B.C.....	Cormorant Isld., B.C...	"	"	350	VAF

HUDSON BAY.

Port Nelson.....	Hudson Bay.....	Dominion Government.	Department of the Naval Service.	750	VCN
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LAND STATIONS.

Le Pas, Man.....	For communication with Port Nelson only.	Dominion Government.	Department of the Naval Service.	750	VBM
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LICENSED Commercial Stations.

Name.	Where Situated.	Owned by.	Operated by.	Range in nautical miles.	Call Signal.
<i>Public Commercial.</i>					
Glace Bay, C.B.....	Near Glace Bay, C.B...	Marconi Wire- less Tel. Co. of Can., Ltd.	Owners.....	3,000	GB.
Louisburg, C.B.....	Cape Breton.....	"	"	Reception	only.
Newcastle, N.B.....	New Brunswick.....	Universal Radio Synd.	"	2,500	CL
<i>Private Commercial.</i>					
Bowen Island, B.C.....	Bowen Island, B.C. Strait of Georgia.	Can. Explo- sives Co.	Owners.....	30	CB
Ocean Falls, B.C.....	Ocean Falls, B.C.....	Ocean Falls	"	150	CD.
Powell River, B.C.....	Powell River, B.C.....	Powell River Co.	"	30	CH
Glengarry, Alta.....	Glengarry Sub. Calgary.	Alberta Oil Co.	"	50	CJ
Section 11, Township 23.....	Sec. 11, Township 23.....	"	"	50	CK
" 31, " 5.....	" 31 " 5.....	Baskins Ltd..	"	50	CM
" 23 " 20.....	" 23 " 20.....	"	"	50	CN
Calgary, Alta.....	Calgary, Alta.....	"	"	50	CO
Edmonton, Alta.....	Edmonton, Alta.....	M. S. Berkeley	"	300	CR
Calgary, Alta.....	Calgary, Alta.....	"	"	200	CP
Fort MacKay, Alta.....	Fort MacKay, Alta.....	"	"	300	CS
Fort Chipewyan, Alta.....	Fort Chipewyan, Alta..	"	"	200	CT
Fort Vermilion, Alta.....	Fort Vermilion, Alta....	"	"	200	CU

LICENSED Experimental Station.

Name.	Where Situated.	Owned by.	Call Signal.
Marconi Test Room.....	Rodney St., Montreal...	Marconi Wireless Telegraph Co. of Canada, Ltd.	XWA



LICENSED Amateur Stations.

Name.	Address.	Call Signal.
Anderson, A. O.	Buckingham, P.Q.	X C N
Rogers, W. P.	Hamilton, Ont.	X C O
Jarest, J. D.	Levis, P.Q.	X C P
Stethem, Hubert.	St. Johns, P.Q.	X C Q
Trepanier, A. N.	Chutes Shawinigan, P.Q.	Reception only.
Phelps, F. W.	Chatham, Ont.	X B U
Sylvestre, L. Adolphe.	Montreal, P.Q.	X C E
Jeune, H. H.	Victoria, B.C.	X A W
Murphy, Nicholas.	Three Rivers, P.Q.	X B Z
Heroux, Charles E.	Trois Rivieres, P.Q.	Reception only.
Brooks, Stanley.	Hamilton, Ont.	X C R
Johns, Clarence.	Victoria, B.C.	X C B
Cuthbert, D.	Bamfield, B.C.	Reception only.
Hewitt, R. F.	Guelph, Ont.	X C S
McClennan, B. A.	Wheatley, Ont.	X C T
Bethune, S. T.	Montreal, P.Q.	X C U
Frinault, L.	Caraquet, N.B.	Reception only.
Morris, J. V. L.	Shawinigan Falls, P.Q.	Reception only.
Kirby, K. C.	Victoria, B.C.	X B L
Bryant, L. D.	Mission City, B.C.	X C V
Thompson, T. C.	Montreal, P.Q.	X B E
Boxer, Arthur.	Westmount, P.Q.	X C W
Allen, Creagh.	Victoria, B.C.	Reception only.
Barnsley, Jack.	Victoria, B.C.	X B K
Tuckett, C. P.	Guelph, Ont.	X C I
Gray, Wm. M.	Chatham, Ont.	X C X
Reading, Harry.	Halifax, N.S.	X C J
Thomas, A. M.	Toronto, Ont.	X C M
Norris, G. B.	Oshawa, Ont.	Reception only.
Renouf, Robt.	Victoria, B.C.	X B R
Thomas, G. D.	Toronto, Ont.	X C L
Strabel, Carl.	Victoria, B. C.	X C Y
Gosnell, G. D.	Victoria, B.C.	X B M
Baltzer, C. E.	Preston, Ont.	X C Z
Giroux, A. W.	Montreal, P.Q.	X B W
Logan, C. P.	St. John, N.B.	X B S
Marshall, E.	Vancouver, B.C.	X B I
Owens, W. E.	Montreal, P.Q.	X C K
Robitaille, H. G.	Montreal, P.Q.	X B P
McCall, J. D.	Montreal, P.Q.	X B D
Gilmour, H.	Montreal, P.Q.	X D A
Natalie, Father.	Three Rivers, P.Q.	X B N
Rogers, K. S.	Charlottetown, P.E.I.	X A R
Telmosse, J. G.	Shawinigan Falls, P.Q.	Reception only.
Ecole Polytechnique.	Montreal, P.Q.	X B T
Meerbegen, Gabriel.	Shawinigan Falls, P.Q.	X C F
Lennox, Ernest.	Vancouver, B.C.	X D B
Navaret, Brother.	Hull, P.Q.	X B Y
Scott, J. B.	Montreal, P.Q.	X B X
Gibson, J. E.	Prince Rupert, B.C.	X D C
Colville, Miss M. S.	Bowmanville, Ont.	X D D
Folger, H. P.	Kingston, Ont.	X C D
Barnes, G. H.	Meighs Corners, P.Q.	X A S
Hebert, D. D.	Trois Rivieres, P.Q.	X D E
Fowler, W. D.	Montreal, P.Q.	X A M
Hobday, F.	Hamilton, Ont.	X D F
Griffiths, C.	Victoria, B.C.	X D G
Langby, A. R.	Victoria, B. C.	Reception only.
Beique, H. Alexandre.	Shawinigan Falls, P.Q.	X C G
Vaughan, H. P.	Montreal, P.Q.	X C C
Elliott, S.	Victoria, B.C.	X B Q
O'Hanley, C. J.	Yarmouth, N.S.	X A K
Elder, H. M.	Westmount, Montreal.	X D H
Crowell, Geo. D.	Sydney, N.S.	X C A
Lacerte, J. Aug.	Yamachiche, P.Q.	Reception only.
Peirce, W. A.	Victoria, B.C.	X A Y
Caley, J. J.	North Bay, Ont.	X D I
Rousseau, T. D.	Levis, P.Q.	X D J
Fortin, Ulric.	Levis, P.Q.	X D K
Trorey, L. G. S.	Vancouver, B.C.	X D L



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LICENSED Amateur Stations—*Concluded.*

Name.	Address.	Call Signal.
Elliott, F. L.....	Toronto, Ont.....	X D M
Dougall, S. D.....	Montreal, P.Q.....	X D N
Coward, K.....	Kingston, Ont.....	Reception only.
Sheepwash, W. J.....	Victoria, B.C.....	X D O
Saint Jacques, Romeo.....	Montreal, P.Q.....	X D P
Morrish, William.....	Gravenhurst, Ont.....	X D Q
Parent, Fred.....	Matane, P.Q.....	X D R
Mitchell, W. K.....	Brantford, Ont.....	X D S
VonGunten, A. H.....	Chatham, Ont.....	Reception only.
Jones, Percy.....	Cape Breton.....	X D T
Nason, H. R.....	Toronto, Ont.....	X D U
McKay, Wm. M.....	Ingersoll, Ont.....	Reception only.
Whyte, A. K.....	Toronto, Ont.....	X D V
Rogers, W. P.....	Hamilton, Ont.....	X C O
Zufelt, Lynn C.....	Beachville, Ont.....	Reception only.
Giles, J. C.....	Kingston, Ont.....	X D W
Cuming, Richard.....	Toronto, Ont.....	X D X
Duff, C. K.....	Hamilton, Ont.....	X D Y
Darling, Clyde.....	Westmount, Montreal, P.Q.....	X C H
Ratcliff, J. H.....	Stouffville, Ont.....	Reception only.
Restall, B. A. B.....	Victoria, B.C.....	X B J
Anderson, F. A.....	Portage la Prairie, Man.....	X D Z
Crowther, G. D.....	Cobourg, Ont.....	X E A
Camerlain, H. V.....	St. Hubert Station, P.Q....	Reception only.
Sawlor, R. H.....	Amherst, N.S.....	X E B



6 GEORGE V, A. 1916

## LICENSED SHIP STATIONS.

The following list shows the vessels of Canadian register which are equipped with radiotelegraph apparatus, their call signal and by whom they are owned and operated:—

Name of Ship.	Port of Registry.	Name of Owners.	Name of Company operating the Station.	Call Signal.
S.S. Assiniboia.....	Montreal, P.Q.....	Can. Pacific Railway.	Marconi Wireless Tel. Co. of Can.....	VGI
" Alberta.....	" .....	" .....	" .....	VFQ
" Athabaska.....	" .....	" .....	" .....	VGG
" Manitoba.....	" .....	" .....	" .....	VGH
" Keewatin.....	" .....	" .....	" .....	VGC
" Boston.....	Yarmouth, N.S.....	" .....	" .....	VFS
" Hamonic.....	Collingwood, Ont.....	Northern Nav. Co....	" .....	VGD
" Huronic.....	" .....	" .....	" .....	VGE
" Province.....	Port Arthur, Ont.....	Great Lakes Towing & Wrecking Company.....	" .....	VFR
" Empire.....	" .....	" .....	" .....	VFP
" Salvor.....	Victoria, B.C.....	B.C. Salvage Co.....	Owners.....	VFV
" Prince Albert.....	Prince Rupert, B.C....	Grand Trunk Pac. Ry	" .....	VFL
" Prince John.....	" .....	" .....	" .....	VFM
" Florence.....	Toronto, Ont.....	T. Eaton.....	Marconi Wireless Tel. Co. of Canada.....	VFT
" Princess Beatrice.....	Victoria, B.C.....	Can. Pacific Railway.	" .....	VFC
" Princess Charlotte.....	" .....	" .....	" .....	VFE
" Princess May.....	Vancouver, B.C.....	" .....	" .....	VFH
" Princess Royal.....	Victoria, B.C.....	" .....	" .....	VFG
" Tees.....	" .....	" .....	" .....	VFK
" Camosun.....	Vancouver, B.C.....	Union Steamship Co.	Owners.....	VFZ
" Princess Adelaide.....	Victoria, B.C.....	Can. Pacific Railway.	Marconi Wireless Tel. Co. of Canada.....	VFA
" Princess Mary.....	" .....	" .....	" .....	VFB
" Princess Alice.....	" .....	" .....	" .....	VFD
" Princess Ena.....	" .....	" .....	" .....	VFJ
" Princess Sophia.....	" .....	" .....	" .....	VFI
" Saronic.....	Sarnia, Ont.....	Northern Nav. Co....	" .....	VGf
" Lord Stratheona.....	Quebec, P.Q.....	Quebec Salvage Co....	" .....	VFX
" A. W. Perry.....	Halifax, N.S.....	Plant Line.....	" .....	VFW
" Royal Edward.....	Toronto, Ont.....	Canadian Northern S.S.	" .....	VGB
" Royal George.....	" .....	" .....	" .....	VGA
S.Y. Aquilo.....	Vancouver, B.C.....	B. J. Rogers.....	Owners.....	VFU
S.S. St. Ignace.....	Port Arthur, Ont.....	Great Lakes Towing and Wrecking Co....	Marconi Wireless Tel. Co. of Canada.....	VGL
" Chelohsin.....	Vancouver, B.C.....	Union Steamship Co..	Owenrs.....	VGN
" Morweñna.....	Montreal, P.Q.....	The N.Y. Nfld. Halifax Shipping Co.....	Marconi Wireless Tel. Co. of Canada.....	VFN
" Prince Arthur.....	Yarmouth, N.S.....	Boston and Yarmouth S.S. Co.	" .....	VGJ
" Prince George.....	" .....	" .....	" .....	VGK
" Evangeline.....	Windsor, N.S.....	Can. Atlantic & Plant Steamship Co.....	" .....	VGO
" Halifax.....	Halifax, N.S.....	" .....	" .....	VGP
" Robert Dollar.....	Victoria, B.C.....	Dollar S.S. Lines.....	" .....	VGM
" Everett G. Griggs.....	" .....	Everett G. Griggs Co.	Owners.....	VGQ
" Douglas H. Thomas.....	Sydney, C.B.....	Dom. Coal Co.....	Marconi Wireless Tel. Co. of Canada.....	VGR
S.Y. Solgar.....	Toronto, Ont.....	G. P. Grant.....	" .....	VGS
S.S. Princess Maquinna.....	Victoria, B.C.....	Can. Pacific Railway.	" .....	VGT
Car Ferry "Ontario No. 1"	Montreal, P.Q.....	Ont. Car Ferry Co....	Radio Elec. Co.....	VGU
S.S. Naronic.....	Port Arthur, Ont.....	Northern Nav. Co....	Marconi Wireless Tel. Co. of Canada.....	VGW
" Seal.....	Windsor, N.S.....	Halifax Trading and Sealing Co.	" .....	VGv
" Deliverance.....	Liverpool, N.S.....	Southern Salvage Co..	Owners.....	VFF
" Bessie Dollar.....	Victoria, B.C.....	Dollar S.S. Lines.....	M. W. T. Co.....	VFO
" Venture.....	Vancouver, B.C.....	Union S.S. Co.....	Owners.....	VGX
" Yarmouth.....	Yarmouth, N.S.....	C.P.R.....	M. W. T. Co.....	VGy
" Princess Patricia.....	Victoria, B.C.....	" .....	Owners.....	VGZ



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LICENSED SHIP STATIONS—*Concluded.*

Name of Ship.	Port of Registry.	Name of Owners.	Name of Company operating the Station.	Call Signal.
S.S. Dalhousie City.....	Toronto, Ont.....	N. St. C. & T. N. Co.	M. W. T. Co.....	VEA
" Corona.....	" .....	C. S.S. Lines.....	" .....	VEB
" Kingston.....	" .....	" .....	" .....	VEC
" Toronto.....	" .....	" .....	" .....	VED
" Hazel Dollar.....	Victoria, B.C.....	Dollar S.S. Lines.....	" .....	VEE
" Syracuse.....	Picton, Ont.....	C. S.S. Lines.....	Radio E. Co.....	VEF
" Rapids King.....	Montreal, P.Q.....	" .....	" .....	VEG
" Chippewa.....	Toronto, Ont.....	" .....	M. W. T. Co.....	VEH
" Garden City.....	" .....	N. St. C. & T. N. Co.	" .....	VEI
" Chicora.....	Halifax, N.S.....	C. S.S. Lines.....	" .....	VEJ
" Macassar.....	Hamilton, Ont.....	" .....	" .....	VEK
" Cayuga.....	Toronto, Ont.....	" .....	" .....	VEL
" Majestic.....	Collingwood, Ont.....	" .....	" .....	VEM
" Turbinia.....	Hamilton, Ont.....	" .....	Radio E. Co.....	VEN
" Cascapedia.....	Quebec, P.Q.....	" .....	M. W. T. Co.....	VEO
" Desola.....	Montreal, P.Q.....	Atlantic Fruit Co.....	" .....	VEP
" Princess Margaret.....	Victoria, B.C.....	C.P.R.....	" .....	VEQ



6 GEORGE V, A. 1916

GOVERNMENT STEAMERS EQUIPPED WITH RADIOTELEGRAPH INSTALLATIONS.

Name.	Range.	Call Signal.
H.M.C.S. <i>Niobe</i> .....	400 miles	VDA
" <i>Rainbow</i> .....	250 "	VDB
C. G. S. <i>Canada</i> .....	150 "	VDC
" <i>Acadia</i> .....	200 "	VDT
" <i>Malaspina</i> .....	200 "	VDU
" <i>Galiano</i> .....	200 "	VDV

OPERATED by the Department of Marine and Fisheries.

Name.	Range.	Call Signal.
C. G. S. <i>Minto</i> .....	150 miles.	VDD
" <i>Stanley</i> .....	150 "	VDE
" <i>Lady Laurier</i> .....	150 "	VDF
" <i>Aberdeen</i> .....	100 "	VDG
" <i>Druid</i> .....	100 "	VDH
" <i>Montcalm</i> .....	150 "	VDJ
" <i>Lady Grey</i> .....	100 "	VDL
" <i>Quadra</i> .....	100 "	VDM
" <i>Estevan</i> .....	200 "	VDN
" <i>Dollard</i> .....	150 "	VDO
" <i>Newington</i> .....	100 "	VDP
" <i>Lurcher Lightship</i> .....	100 "	VDR
" <i>Simcoe</i> .....	100 "	VDS
" <i>Aranmore</i> .....	200 "	VDQ

OPERATED by the Department of Railways and Canals.

Name.	Range.	Call Signal.
C. G. S. <i>Durley Chine</i> .....	200 miles.	VDQ
" <i>Sheba</i> .....	200 "	VDZ

OPERATED by the Post Office Department.

Name.	Range.	Call Signal.
C. G. S. <i>Lady Evelyn</i> .....	100 miles.	VDX



## SESSIONAL PAPER No. 38

## OPERATED by the Customs Department.

Name.	Range.	Call Signal.
C. G. S. <i>Margaret</i> .....	200 miles.	VDW

## OPERATION OF THE COAST STATION SERVICES.

On August 4, 1914, all the radiotelegraph stations in the Dominion were placed on a war basis. The amount of business handled by the East Coast system (operated by the Marconi Wireless Telegraph Company of Canada, Limited, under contract), shows a decrease from last year's business, amounting to 85,759 messages containing 1,246,633 words.

The Great Lakes system (also operated by the Marconi Wireless Telegraph Company of Canada, Limited, under contract), shows an increase of 6,184 messages containing 106,719 words.

The West Coast system (operated directly by this Department) shows a decrease of 58,968 messages containing 673,805 words.

For comparative statement of business handled by the Coast Station systems during the last five years, see Table 1.

An agreement was entered into with the Department of Railways and Canals whereby this Department assumed responsibility for the operation of the Le Pas and Port Nelson stations on November 10, 1914; the cost of the same being borne by that Department. The arrangement is proving satisfactory to all parties concerned.

The communication has proved of great value to the Department of Railways and Canals in connection with their construction work at Port Nelson.

During the season of navigation Port Nelson also operates as a coast station, a small set of  $\frac{1}{2}$  K.W. power, using a 600 metre wavelength, being specially installed for this purpose; this set has a range of approximately 200 nautical miles.

A constant watch is maintained on this set except during the periods when communication is in progress with Le Pas, and communication is established with all vessels fitted with radiotelegraph apparatus plying to and from Port Nelson.

Table 7 shows the amount of business handled by the Stations.



TABLE No. 1—COMPARATIVE STATEMENT of Business handled by the Coast Stations Systems during the last Five Years.

Service.	1910-11.		1911-12.		1912-13.		1913-14.		1914-15.		COMPARISON WITH 1913-14.		
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Increase or Decrease.	Messages.	Words.
East Coast.....	71,594	1,179,434	119,049	1,824,450	153,843	2,704,411	145,605	2,443,145	59,846	1,196,512	Decrease.	85,759	1,246,633
Great Lakes.....	Nil.	.....	1,043	17,095	2,750	52,422	9,601	219,786	15,785	326,505	Increase.	6,184	106,719
West Coast.....	48,074	647,461	76,158	997,900	115,494	1,518,926	157,354	2,206,331	98,386	1,532,526	Decrease.	58,968	673,805
Totals.....	119,668	1,826,895	196,250	2,839,445	272,087	4,275,759	312,560	4,869,262	174,017	3,055,543	Net Decrease.	138,543	1,813,719



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## REVENUE.

On account of the war and the placing of the Coast Stations on a war basis the total revenue accruing to the Department from tolls on messages handled by the different stations shows a net decrease of \$4,600.32.

The total revenue collected during the year amounts to \$11,738.35, against \$16,338.67 in 1913-14; The West Coast service shows a decrease of \$4,663.26; the Great Lakes an increase of \$58.37, and the East Coast an increase of \$4.57.

TABLE No. 2.—Comparative Statement of Revenue received by the Coast Stations Services during the past Six Years.

	1909-10.	1910-11.	1911-12.	1912-13.	1913-14.	1914-15.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
East Coast.....	Nil.	Nil.	229 57	475 00	318 42	322 99
Great Lakes.....	Nil.	Nil.	Nil.	17 08	27 55	85 92
West Coast.....	Nil.	3,108 63	4,484 77	9,928 40	15,992 70	11,329 44
Totals.....	Nil.	3,108 63	4,714 34	10,420 48	16,338 67	11,738 35



TABLE No. 3. — Detailed Statement of Business handled by the Ten Stations on the Pacific Coast owned and operated directly by this Department.

Name of Station.	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.		Cost of Maintenance.	Revenue.
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.		
Gonzales Hill (Victoria).	1,836	24,546	4,602	90,425	1,907	96,989	5,426	157,531	15,208	184,992	55	1,096	\$ 4,296 03	\$ 2,940·93
Pachena Point .....	120	1,808	163	3,168	530	17,603	700	33,050	1,927	15,872	4,629	80,233	4,330 15	188·01
Estevan Point.....	1,273	14,955	21	328	81	3,676	185	1,387	3,375	30,273	10,585	157,037	3,469·29	1,841·60
Dead Tree Point.....	8	132	1,211	27,231	7	99	2	22	1,712	16,208			1,466 98	569·53
Ikeda Head.....	8	81	170	2,392	3	53	10	111	1,081	7,348	6	78	2,312 74	101·92
Triangle Island.....	953	11,416	44	874	245	6,242	659	4,119	4,100	34,311	9,330	143,164	4,266 04	1,281·60
Point Grey.....	800	11,501	974	17,300	343	1,383	139	781	2,516	45,163			2,435 35	729·01
Digby Island(Pr.Rupert)	654	8,603	4,199	88,137	239	5,323	957	8,975	2,909	31,357	22	503	4,247 68	2,747·89
Cape Lazo.....	340	5·331	136	1,935	177	3,925	273	3,876	2,848	21,222	5,961	77,227	4,205 21	356·85
Alert Bay.....	229	2,619	700	8,966	165	3,649	65	1,738	1,555	14,059	13	103	3,313 80	572·10
District Office at Victoria													5,935 93	
General Account (including charter of steamers, Esquimalt, Workshop, etc.).....													3,960 07	
Totals.....	6,221	80,992	12,220	240,756	3,697	138,942	8,416	211,590	37,231	400,805	30,601	459,441	44,239 27	11,329·44

Total number of messages handled.....	98,386
Total number of words handled.....	1,532,526
Total cost of maintenance of statistics (including district office, workshop, etc.).....	\$44,239 27
Total revenue.....	\$11,329 44



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TABLE No. 4.—Detailed Statement of Business handled by the Eight Stations on the Great Lakes, owned by the Department of the Naval Service, and operated by the Marconi Wireless Telegraph Company of Canada, Limited.

Name of Station.	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Messages.		Messages.		Cost of Maintenance.	Govern-ment per-centage of Revenue.
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	\$	cts.
Port Arthur.....	394	10,816	1	8	235	4,659	14	246	1,273	26,318	316	4,569	3,500 00	17.71
Sault Ste. Marie.....	719	12,312			557	13,828	10	191	1,927	33,187	1,281	23,830	3,500 00	15.04
Tobermory.....	137	2,362	11	197	89	2,801	3	55	643	10,692	1,500	35,504	3,500 00	.42
Midland.....	100	1,724	8	158	248	7,560			781	13,451	668	18,371	3,500 00	2.31
Point Edward.....	272	4,635	2	51	161	5,801			546	10,950	412	7,899	3,519 99	11.35
Port Burwell.....	269	3,534	1	8	37	961			239	5,909	33	924	3,500 00	5.60
Toronto.....	1,113	17,444	8	105	91	1,609			1,294	33,887	112	2,845	3,500 00	31.88
Kingston.....	80	1,476	1	25	24	493			155	4,710	20	400	3,427 08	1.61
Total.....	3,084	54,303	32	552	1,442	37,712	27	492	6,858	139,104	4,342	94,342	27,947 07	85.92

Total number of messages handled.....	15,785
Total number of words handled.....	326,505
Total cost of maintenance.....	\$27,947 07
Total revenue.....	\$ 85 92



TABLE No. 5.—Detailed Statement of Business handled by the Twenty Stations in the Gulf and River St. Lawrence and East Coast, owned by this Department and operated by the Marconi Wireless Telegraph Co. of Canada, Limited, under contract.

Name of Station.	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.		Cost of Maintenance.		Government per centage of Revenue.	
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	\$	cts.	\$	cts.
Cape Sable.....	614	7,651	1	8	230	4,706	735	5,344	890	11,517			3,778	33		
Partridge Isld. (St. John, N.B.)....	136	2,279			471	12,144	108	1,388	151	2,405	34	1,004	3,758	40		
Cape Race.....	6,556	96,189	97	552	323	7,274	59	655	2,666	60,123	5	189	3,760	90		
Grindstone Island.....	77	1,052	830	23,909	69	1,767	265	2,052	375	5,055	444	7,458	1,200	00	322	99
Cape Bear.....	42	700	49	1,063	794	17,852	16	194	73	1,391	1,601	62,803	2,757	72		
Point Riche.....	2	42	5	98	21	499	4	30	68	805	392	8,392	3,500	00		
Point Amour.....	504	10,806	250	4,751	194	4,506	420	12,863	1,998	54,930	195	4,612	4,013	00		
Belle Isle*.....	48	613	39	1,176	76	1,677	643	4,970	397	5,882	2,463	42,749	5,014	35		
Cape Ray.....	400	5,611	54	1,336	217	5,166	586	5,093	1,560	27,230	591	8,316	3,758	43		
Harrington.....	1	30	6	99			39	263	95	683			2,500	00		
Heath Point.....	416	7,338	119	3,057	254	5,597	441	12,435	721	14,145	4,440	75,036	3,756	50		
Fame Point.....	504	10,806	250	4,751	194	4,506	420	12,863	1,998	54,930	195	4,612	3,756	50		
Clarke City.....	87	2,858	459	15,458	16	387	74	670	447	7,414	899	22,237	3,500	00		
Father Point.....	466	8,062	221	6,431	183	4,672	12	127	626	11,922	42	1,640	3,500	00		
Grosse Isle.....	75	1,508	59	1,374	339	5,320	385	4,309	173	3,217	312	6,471	2,500	00		
Quebec.....	823	14,524	48	748	537	14,374	241	9,218	651	13,410	198	3,698	2,500	00		
Three Rivers.....	112	2,014			408	10,242	1	53	112	2,157	920	18,760	3,757	20		
Montreal.....	398	8,503	1	16	18	412			377	6,693	14	330	3,500	90		
Sable Island.....	2,443	33,810	839	9,022	305	3,253	1	7	1,014	15,623						
Camperdown (Halifax)...	2,301	56,225	277	3,722	469	10,229	40	606	1,164	21,128						
Total.....	16,134	271,041	3,625	77,571	5,118	114,583	4,490	73,140	15,557	320,660	12,745	268,307	60,812	23	322	99

Total number of messages handled.....	57,669
Total number of words handled.....	1,125,302
Total cost of maintenance.....	\$ 60,812 23
Total Revenue.....	\$ 322 99

\* Includes returns from April 1, 1914 to October 31, 1914 only.



TABLE No. 6.—Detailed Statement of Business handled by the Two Stations on the East Coast owned and operated by the Marconi Wireless Telegraph Company of Canada, Limited, under contract with the Department of the Naval Service.

Name of Station.	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.		Cost of Maintenance.	Revenue.
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	\$ cts.	\$ cts.
North Sydney...../.....	73	1,315	1	7	166	5,167	145	1,260	412	8,211			1,750 00	
Pictou.....	51	638	458	35,134	512	12,199	86	1,590	247	4,921	26	768	1,750 00	
Total.....	124	1,953	459	35,141	678	17,366	231	2,850	659	13,132	26	768	3,500 00	

Total number of messages handled.....	2,177
Total number of words handled.....	71,210
Total cost of maintenance.....	\$ 3,500 00
Total revenue.....	Nil.



TABLE No. 7.—Detailed Statement of Business handled by Le Pas and Port Nelson Radiotelegraph Stations, owned by the Department of Railways and Canals.

Name of Station.	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.	
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.
Le Pas.....			804	17,634			1,213	125,152	278	9,714		
Port Nelson.....	1	11	926	20,293	245	6,493	1,395	134,411	360	11,333	37	920
Total.....	1	11	1,730	37,927	245	6,493	2,608	259,563	638	21,047	37	920

Total number of messages handled..... 5,259  
Total number of words handled..... 325,961

The cost of maintenance of these stations is borne by the Department of Railways and Canals and all revenue collected accrues to that Department.



## SESSIONAL PAPER No. 38

## EXAMINATIONS FOR CERTIFICATES OF PROFICIENCY IN RADIOTELEGRAPHY.

133 Operators were examined during the year, including 36 re-examinations.  
53 candidates were successful and 80 failed.

The following list shows the names of the successful candidates for Certificates of Proficiency in Radiotelegraphy.

Number of Certificate.	Date of Certificate.	Name.	Grade of Certificate.	Where Examination held.
36.....	May 27, 1914..	Maxwell, Geo.....	1st Class Ship.....	Victoria, B.C.
37.....	May 19, 1914..	Kelk, E. W.....	1st Class Ship.....	Port Burwell, Ont.
38.....	May 26, 1914..	Young, H. G.....	1st Class Ship.....	Midland, Ont.
39.....	June 12, 1914..	Hickmott, W. R.....	1st Class Coast and Ship..	Ottawa, Ont.
40.....	May 16, 1914..	Whitby, A. G.....	1st Class Coast and Ship..	Point Edward, Ont.
41.....	May 27, 1914..	Blackburn, G. W.....	1st Class Coast.....	Midland, Ont.
42.....	May 22, 1914..	Eaton, G. F.....	1st Class Coast.....	Toronto, Ont.
43.....	May 14, 1914..	Lawton, A. T.....	1st Class Coast and Ship..	Sault Ste. Marie, Ont.
44.....	May 26, 1914..	Simpson, W. E.....	1st Class Coast.....	Midland, Ont.
45.....	May 16, 1914..	Beebe, V. C.....	1st Class Coast and Ship..	Point Edward, Ont.
46.....	May 16, 1914..	Sundstrom, A. I.....	1st Class Coast and Ship..	Point Edward, Ont.
47.....	May 16, 1914..	Gray, W. J.....	1st Class Coast.....	Sault Ste. Marie, Ont.
48.....	June 10, 1914..	Tee, H. D.....	1st Class Ship.....	Victoria, B.C.
49.....	June 19, 1914..	Wikstrom, W. G.....	1st Class Ship.....	Victoria, B. C.
51.....	July 22, 1914..	Newberg, C. G.....	1st Class Ship.....	Halifax, N.S.
52.....	July 7, 1914..	Daniel, J.....	1st Class Ship.....	Victoria, B.C.
53.....	July 7, 1914..	Farthing, L. G.....	1st Class Ship.....	Victoria, B.C.
54.....	July 22, 1914..	Leonard, P.....	1st Class Ship.....	Victoria, B.C.
55.....	Sept. 8, 1914..	Sutherland, A.....	1st Class Coast.....	Ottawa, Ont.
56.....	Oct. 13, 1914..	Periard, M. R.....	1st Class Ship.....	Victoria, B.C.
57.....	Sept. 10, 1914..	Craig, T.....	1st Class Coast.....	Port Nelson, Man.
58.....	July 18, 1914..	Emmerson, R. G.....	1st Class Ship.....	Halifax, N.S.
59.....	Nov. 11, 1914..	Currie, S.....	1st Class Coast.....	Cape Sable, N.S.
60.....	Nov. 11, 1914..	Senior, B.....	1st Class Coast and Ship..	Cape Sable, N.S.
61.....	Nov. 12, 1914..	Leslie, H. G.....	1st Class Coast and Ship..	Cape Sable, N.S.
62.....	Nov. 14, 1914..	Hood, H. A.....	1st Class Coast.....	Cape Sable, N.S.
63.....	Nov. 12, 1914..	Rennie, B. A.....	1st Class Coast.....	Cape Sable, N.S.
64.....	Dec. 4, 1914..	Peirce, W. A.....	1st Class Ship.....	Victoria, B.C.
65.....	Dec. 14, 1914..	Raine, T. C.....	1st Class Snip.....	Victoria, B.C.
66.....	Dec. 16, 1914..	Stirling, J. A.....	1st Class Ship.....	Victoria, B.C.
67.....	Jan. 8, 1915..	MacDonald, J. H.....	1st Class Ship.....	Victoria, B.C.
68.....	Jan. 20, 1915..	Fenwick, J. R.....	1st Class Ship.....	Toronto, Ont..
69.....	Jan. 20, 1915..	Downer, J. H.....	1st Class Ship.....	Toronto, Ont.
70.....	Jan. 14, 1915..	Irvine, B.....	1st Class Ship.....	Victoria, B.C.
71.....	Jan. 20, 1915..	King, A. A.....	1st Class Ship.....	Victoria, B. C
72.....	Jan. 18, 1915..	Newberg, J.....	1st Class Ship.....	Victoria, B.C.
73.....	Jan. 25, 1915..	Robson, A. H.....	1st Class Ship.....	Victoria, B.C.
74.....	Feb. '8, 1915..	Letts, R.....	1st Class Coast and Ship..	Ottawa, Ont.
75.....	Feb. 1, 1915..	Cope, G. E.....	1st Class Coast and Ship..	Halifax, N.S.
76.....	Feb. 5, 1915..	Hayman, E. D.....	1st Class Coast.....	Barrington, N.S.
77.....	Feb. 26, 1915..	McWatters, R.....	1st Class Coast.....	Ottawa, Ont.
78.....	Feb. 22, 1915..	Wright, A. G.....	1st Class Coast.....	Cape Ray, Nfld.
79.....	Feb. 26, 1915..	MacGillivray, P. P...	1st Class Coast.....	Camperdown, N.S.
80.....	Feb. 26, 1915..	Spracklin, C. R.....	1st Class Ship.....	Camperdown, N.S.
81.....	Feb. 26, 1915..	Dodds, P. E.....	1st Class Coast.....	Camperdown, N.S.
82.....	Feb. 15, 1915..	Kerton, J. W.....	1st Class Coast and Ship..	Cape Race, Nfld.
83.....	Mar. 2, 1915..	Coade, H. A.....	1st Class Coast.....	Halifax, N.S.
84.....	Mar. 22, 1915..	McCormack, G. N....	1st Class Coast.....	Ottawa, Ont.
85.....	Mar. 17, 1915..	Tufts, E. S.....	1st Class Ship.....	Pictou, N.S.
86.....	Mar. 10, 1915..	Nevin, W. B.....	1st Class Ship.....	Victoria, B.C.
87.....	Mar. 10, 1915..	McAllister, J. C.....	1st Class Ship.....	Victoria, B.C.
88.....	Mar. 23, 1915..	Lucas, L. A.....	1st Class Ship.....	Victoria, B.C.
89.....	Mar. 22, 1915..	Woods, M. J.....	1st Class Ship.....	Victoria, B.C.



6 GEORGE V, A. 1916

ASSISTANCE RENDERED TO SHIPS DURING THE YEAR BY THE GOVERNMENT RADIO-  
TELEGRAPH SERVICE.*West Coast.*

SS. *Prince Albert*.—On April 19, 1914 the ss. *Prince Albert* bound for Prince Rupert from Vancouver ran ashore on the Union Bar at 3.00 a.m. The vessel remained in this position until 2.20 a.m. on April 20 when she floated off the bar and proceeded on her journey to Prince Rupert.

The Cape Lazo station was in constant communication with the *Prince Albert* and all telegrams to and from the vessel were promptly dealt with.

SS. *Prince Albert*.—On August 18, 1914, the Dead Tree Point Station picked up distress signals from the ss. *Prince Albert* at 9.30 p.m., the vessel reported being ashore on Butterworth Rock outside Browne's Passage. The *Prince Albert* also established communication with the Digby island (Prince Rupert) station, which station immediately got in touch with the captains of the ss. *Prince John* and C.G.S. *Lillolet* when these vessels proceeded to the assistance of the *Prince Albert*.

Schooner *Victoria*.—On November 6, 1914, the C.G.S. *Newington* reported by radiotelegraphy from Cape Lazo station that the schooner *Victoria* was broken down off Oyster bay and required assistance. The agents of the schooner were at once informed of the accident and a tug was despatched to the assistance of the schooner.

SS. *Princess Royal*.—On November 27, 1914, the ss. *Princess Royal* reported to her agents in Victoria by radiotelegraphy through the Cape Lazo station that she was ashore on Jedidah island making water and requiring assistance. The ss. *Princess May* was sent to the scene of the disaster and stood by until assistance was no longer required. Communication between the agents and captains of both vessels was maintained throughout the whole proceedings without delay.

*East Coast.*

SS. *Columbian*.—On May 4, 1914, a fire broke out on the ss. *Columbian* in mid-Atlantic and the vessel had to be abandoned, the crew taking to the ship's boats. An explosion having destroyed the radiotelegraph apparatus, it was impossible for the *Columbian* to obtain assistance from any vessels in her vicinity. Later, however, the ss. *Seydlitz* notified the Sable Island station that she had sighted a burning hulk. This information was sent out by the Sable Island station to all ships in range, with the result that the ss. *Franconia* on receipt of the same altered her course and picked up one of the *Columbian's* boats.

SS. *Empress of Ireland*.—On May 29, 1914, the *Empress of Ireland* and the ss. *Storstad* were in collision in the river St. Lawrence. Radiotelegraph communication was at once established with the Father Point station, which immediately advised all vessels at hand of the accident. Owing to the short time which elapsed between the collision and the foundering of the *Empress of Ireland* only 477 out of the total of 1,504 persons on board were saved.

SS. *Sacha*.—On July 22, 1914, the ss. *Royal George* when in the gulf of St. Lawrence picked up a distress call from the French steamer *Sacha*. Radiotelegraph communication was immediately established between the two vessels and the *Royal George* proceeded at full speed towards the position given by the *Sacha* which was just off the island of St. Pierre, Newfoundland. After proceeding in that direction for a short time the *Sacha* advised the *Royal George* that she was out of danger. A serious fire had broken out on the *Sacha*, which, however, the crew had eventually been able to master.



## DEPARTMENT OF THE NAVAL SERVICE

SESSIONAL PAPER No. 38

S.S. *Denver*.—On March 23, 1915, the ss. *Denver* of the Mallory Line, which was leaking badly some 1,500 miles from Cape Race, sent out calls for assistance, which were answered by several vessels in her vicinity and also by the Cape Race station. The Cape Race station kept in communication with the vessels engaged in rescue work until all on board the *Denver* had been taken off.

### *Great Lakes.*

One or two vessels grounded at different points on the Great Lakes during the season; the cases were, however, not serious and the vessels were refloated without trouble. On all occasions radiotelegraph communication was immediately established with the Government radiotelegraph coast stations in the vicinity.

## NEW CONSTRUCTION, ADDITIONS AND ALTERATIONS.

### *East Coast.*

In pursuance of the policy of Government ownership of Radiotelegraph Coast stations, an agreement was entered into with the Marconi Wireless Telegraph Company of Canada whereby the Sable Island and Camperdown stations have been transferred to the department by the Marconi Wireless Telegraph Company of Canada, Limited, on March 31, 1915.

During the year all the stations on the river and gulf of St. Lawrence and on the East Coast were equipped with a modern type receiving apparatus of the same design as that supplied to the Kingston, Toronto and Port Burwell stations on the Great Lakes. The installation of these receivers has resulted in considerably increasing the reception range of the stations and has proved a good investment.

### *Quebec.*

The power of the Quebec station has been increased by the installation of new transmitting apparatus of 2 k.w. power. The set operates from the city power supply and a musical spark is obtained by means of a non-synchronous disc discharger; the total cost of the installation amounted to \$895.74.

### *Montreal.*

A suitable site for the proposed new station at Montreal was secured in the parish of Cote St. Michel, Cote Nord; the area of the site is nine arpents and the purchase price was \$1,400 per arpent.

### *Cape Race.*

In order to increase the range of the Cape Race station to 500 miles, an agreement was entered into with the Marconi Wireless Telegraph Company of Canada to replace the two 160 ft. wood housing masts by two 253 ft. steel tubular masts; this work was completed in October, 1914, the department's share of the cost of the same amounting to \$8,000. The Cape Race station is now able to communicate with vessels plying on the southern track between New York and Europe, and its value as an aid to navigation, particularly in view of ice conditions applying in that vicinity, has been considerably enhanced by the installation of the new masts.



## GREAT LAKES.

*Kingston.*

The installation of a bored pipe well, with pump and necessary pipe connections to the operating house and double dwelling house, was completed at the Kingston station. The total cost of this work, including \$75 paid out of last year's vote, was \$592.97. The site of the station was fenced in and a board walk laid down for the sum of \$272.84.

A water closet was installed in each house of the double dwelling at a cost of \$98.

*Midland.*

Arrangements were made with the corporation of Midland to have the radiotelegraph station connected to the town water supply; the work of continuing the supply mains to a point opposite the station was duly carried out by the corporation, the department contributing the sum of \$200 towards the cost of the same. The necessary pipe-work to connect the double dwelling and operating house to the supply mains was installed at a cost of \$323.88. Public tenders were called for the installation of a septic tank and drainage at the Midland station. The contract was awarded to Messrs. Armstrong, Brothers & Frank of Midland, who submitted the lowest tender of \$452.

*Port Burwell.*

The site of the radiotelegraph station at Port Burwell was fenced in at a cost of \$165.

A bored pipe well was installed at this station for the sum of \$685.

*Toronto Island.*

A septic tank was installed at the Toronto island station at a cost of \$228.

## WEST COAST.

*Cape Lazo.*

A battery driven  $1\frac{1}{2}$  k.w. transmitting set was installed at the Cape Lazo station for the purpose of working with the Point Grey and Powell River stations and with ships in the gulf of Georgia, thus saving the running of the large transmitting sets for short distance communication.

Improvements were made to the existing earth system and a septic tank and drainage system was installed and the necessary plumbing work in connection therewith carried out. Three acres of the site were stumped and ploughed. The total cost of the above work amounted to \$3,826.

*Digby Island (Prince Rupert).*

Public tenders were invited for the erection of a double dwelling house at the Digby Island station and the contract was awarded to Mr. John Hilditch of Prince Rupert, B.C., who submitted the lowest tender of \$9,200 for the work. The building was completed in December, 1914.



## SESSIONAL PAPER No. 38

Three and three-quarter acres of the site were cleared and stumped at a cost of \$1,294.08. This work was carried out by the local engineer of the Department of Public Works for this department.

*Esquimalt Workshop.*

Two wooden housing masts, 200 feet and 136 feet high respectively, were installed in the dockyard at Esquimalt in connection with our experimental and test room at that point, and additional testing instruments were purchased. We are now in a position to test all apparatus under working conditions.

A 10 horse power three-phase motor and two transformers were also installed in connection with the test room; a standard ground connection was put down.

The total cost of the above work was \$4,554.34.

*Point Grey.*

Two standard 185-foot housing masts were erected at the Point Grey station; three acres of the site were cleared and the old tree mast dismantled at a cost of \$4,591.74.

*Estevan Point.*

In order to increase the range of the Estevan Point station the height of the mast was increased to 220 feet and a new mast 250 feet high was installed, using an existing tree for the lower mast; this work entailed the installation of additional guy anchorages and considerable clearing. Improvements were made to the existing ground connection. The total cost of the above work was \$5,164.81.

*Gonzales Hill (Victoria).*

A 6 k.w. 60-cycle transformer was supplied to the Gonzales Hill station at a cost of \$314.35. The drainage from the station buildings was connected up with the city sewage system; the total cost amounted to \$990, of which \$555 was borne by this department, the balance being borne by the Meteorological Branch of the Department of Marine, whose local observatory was connected on the same system.

## HUDSON BAY AND STRAITS.

The official acceptance test of the Port Nelson radiotelegraph equipment was made by an officer of the department on September 10, 1914.

*Location of Sites for Stations of Hudson Bay System.*

An engineer was despatched to Hudson strait in the C.G.S. *Minto* last summer and locations on Charles island, Big island and Mansel island in Hudson straits were reported on.

A suitable site was located on Mansel island and construction on this station will be commenced during the coming summer.



PERSONNEL.

The personnel of the radiotelegraph service in the Dominion is as follows:—

	GOVERNMENT.				COMMERCIAL.			
	Head-quart-ers.	Coast Sta-tions.	Com-mercial Sta-tions.	Ship Sta-tions.	Head-quart-ers.	Coast Sta-tions.	Com-mercial Sta-tions.	Ship Sta-tions.
Engineers and officers-in-charge....	3	13	2	24	8	24	24	51
Operators.....		22	4	.....		43	12	34
Other employees.....	4	5	1		4	.....	.....	.....
Executive officials and inspectors..	2	1	.....	.....	2	.....	.....	4
	9	41	7	24	54	67	36	89

Total personnel, 327

I am pleased to report that the staff directly in the employ of this department at Headquarters, at the British Columbia coast stations, and on board departmental ships, have taken great interest in their work and have carried out their duties in a satisfactory and efficient manner.

The placing of certain stations on a naval basis has required the enlistment of a number of the men in the R.N.C.V.R.; there has been no lack of volunteers in this reference. A considerable number of men have also volunteered for active service with the different overseas contingents.

I have the honour to be, sir,  
Your obedient servant,

C. P. EDWARDS,  
*General Superintendent Government Radiotelegraph Service.*







